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**ADDENDUM NO. 2
July 6, 2023**

**Taxiway A Reconstruction – Phase 3
Duluth International Airport (DLH)
Duluth, Minnesota
City of Duluth No. 23-4409
AIP No. 3-27-0024-074-2022
SP No. A6901-205
SEH No. DULAI 168804**

From: Short Elliott Hendrickson Inc.
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651.490.2000

To: Document Holders

DOCUMENT HOLDERS on the above-named project are hereby notified that this document shall be appended to, take precedence over and become part of the original bidding documents dated June 13, 2023 and Addendum No. 1 dated July 3, 2023 for this work. Bids submitted for the construction of this work shall conform to this document.

This addendum consists of the revised bid form reflected in BidExpress, and revisions to specifications and drawings as listed below.

Changes to Bidding Requirements:

1. Document 00 41 00 – Bid Form: The bid form has been revised to reflect updated project quantities and revised bid item descriptions. The Bid Form is updated in BidExpress.

Changes to Specifications:

2. Item P-401 Asphalt Mix Pavement – Specification is updated to reflect a revised asphalt binder in section 401-2.3. Section 401-3.4 is updated to reflect that the use of up to 20 percent RAP material in the bituminous surface course mix is allowable. DELETE pages 3 and 6 of Item P-401 and REPLACE with attached updated pages 3 and 6.
3. Item D-751 Manholes, Catch Basins, Inlets and Inspection Holes – Specification is updated to include method of measurement description for Adjust Manhole/Catch Basin Casting bid item. DELETE in its entirety and REPLACE with the attached revised specification section.
4. Item L-125 Installation of Airport Lighting Systems – New specification sections 2.14 & 2.15 are added for proposed electrical vault work. DELETE in its entirety and REPLACE with the attached revised specification section.
5. Item T-901 Seeding – Specification is updated to clarify required seeding and fertilizer products. DELETE in its entirety and REPLACE with the attached revised specification section.

Changes to Drawings:

6. Drawing G0.01 Table of Contents – New Sheet E-401 Electrical Vault Plan is included in the list of project drawings.
7. Drawing G5.03 Statement of Estimated Quantities - Schedule A – Quantity and Bid Item Description Updates. DELETE in its entirety and REPLACE with the attached revised drawing.
8. Drawing G5.04 Statement of Estimated Quantities - Schedule B – Quantity and Bid Item Description Updates. DELETE in its entirety and REPLACE with the attached revised drawing.

9. Drawing ED102 Electrical Demo Plan 2 – Additional electrical demolition reflected under proposed airfield pavement. DELETE in its entirety and REPLACE with the attached revised drawing.
10. Drawing ED103 Electrical Demo Plan 3 – Additional electrical demolition reflected under proposed airfield pavement, and demolition of additional light fixture reflected in plan. DELETE in its entirety and REPLACE with the attached revised drawing.
11. Drawing E-101 Electrical New Work Plan 1 – Updated sign faces along what is now identified as Taxiway Romeo 5. DELETE in its entirety and REPLACE with the attached revised drawing.
12. Drawing E-102 Electrical New Work Plan 2 – Updated circuitry notes included for circuit TW ACTR. Updated notes for existing FAA ductbank. Plan reflects revised locations for lights AC9 and AC14. Keyed note 4 added for clarification to required cable splicing. Updated sign face along what is now identified as Taxiway Romeo 5. DELETE in its entirety and REPLACE with the attached revised drawing.
13. Drawing E-103 Electrical New Work Plan 3 – Updated circuitry loop is reflected for circuit TW ACTR, and installation of (2) additional light fixtures is reflected. Revised where circuit TW ACTR enters first light fixture along TW Alpha, updating light fixture AC20 to now be labeled as CS74. Sign faces for airfield signs S35 and S49 are revised. DELETE in its entirety and REPLACE with the attached revised drawing.
14. Drawing E-105 Electrical New Work Plan 5 – Drawing now shows circuitry routed to existing sign fixture. DELETE in its entirety and REPLACE with the attached revised drawing.
15. Drawing E-106 Electrical New Work Plan 6 – Updated sign faces along what is now identified as Taxiway Romeo 6 and sign face for sign S40. DELETE in its entirety and REPLACE with the attached revised drawing.
16. Drawing E-107 Electrical New Work Plan 7 – Drawing now shows circuitry routed to existing sign fixture. Keyed note locations for keyed note 1 updated. DELETE in its entirety and REPLACE with the attached revised drawing.
17. Drawing E-108 Electrical New Work Plan 8 – Updated signage along what is now identified as Taxiway Romeo 7. Updated sign S10 location. Added sign S44 into drawing. DELETE in its entirety and REPLACE with the attached revised drawing.
18. Drawing E-109 Electrical Signage & Taxiway Light Fixture Locations – Tabulation updated for revised and new airfield sign locations. Tabulation updated for revised and new light fixture locations. DELETE in its entirety and REPLACE with the attached revised drawing.
19. Drawing E-111 Electrical Signage Plan – Updated signage according to recent taxiway nomenclature updates. DELETE in its entirety and REPLACE with the attached revised drawing.
20. Drawing E-112 New Homerun Plan – Updated location of circuit callouts. Constant current regulator (CCR) work now shown on new sheet E-401. DELETE in its entirety and REPLACE with the attached revised drawing.
21. Drawing E-401 Electrical Vault Plan– INSERT new plan sheet to reflect installation of new 480V electrical panel in electrical vault facility along with CCR updates.

Clarifications:

22. Question – What are the sizes of existing storm sewer pipe proposed to be removed?
 - a. SEQ Notes have been added to sheets G5.03 and G5.04 to better identify the size of existing storm sewer pipe to be removed with Items 54 and 119.

Attachments:

Updated Bid Form reflected in BidExpress

Updated Specifications

Updated Drawings

Note: Receipt of this Addendum No.2, dated July 6, 2023 shall be acknowledged on [BidExpress](#). Failure to do so will not allow Bidder to submit Bid.

END OF ADDENDUM

Fine Aggregate Material Requirements

Material Test	Requirement	Standard
Liquid limit	25 maximum	ASTM D4318
Plasticity Index	4 maximum	ASTM D4318
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Clay lumps and friable particles	0.3% maximum	ASTM C142
Sand equivalent	45 minimum	ASTM D2419
Natural Sand	0% to 15% maximum by weight of total aggregate	ASTM D1073

c. Sampling. ASTM D75 shall be used in sampling coarse and fine aggregate.

401-2.2 Mineral filler. Mineral filler (baghouse fines) may be added in addition to material naturally present in the aggregate. Mineral filler shall meet the requirements of ASTM D242.

Mineral Filler Requirements

Material Test	Requirement	Standard
Plasticity Index	4 maximum	ASTM D4318

401-2.3 Asphalt binder. Asphalt binder shall conform to ASTM D6373 Performance Grade (PG) **58H-34**.

401-2.4 Anti-stripping agent. Any anti-stripping agent or additive (anti-strip) shall be heat stable and shall not change the asphalt binder grade beyond specifications. Anti-strip shall be an approved material of the Department of Transportation of the State in which the project is located.

COMPOSITION

401-3.1 Composition of mixture(s). The asphalt mix shall be composed of a mixture of aggregates, filler and anti-strip agent if required, and asphalt binder. The aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF).

401-3.2 Job mix formula (JMF) laboratory. The laboratory used to develop the JMF shall possess a current certificate of accreditation, listing D3666 from a national accrediting authority and all test methods required for developing the JMF; and be listed on the accrediting authority's website. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Resident Project Representative (RPR) prior to start of construction.

401-3.3 Job mix formula (JMF). No asphalt mixture shall be placed until an acceptable mix design has been submitted to the RPR for review and accepted in writing. The RPR's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.

When the project requires asphalt mixtures of differing aggregate gradations and/or binders, a separate JMF shall be submitted for each mix. Add anti-stripping agent to meet tensile strength requirements.

Table 2. Aggregate – Asphalt Pavements

Sieve Size	Percentage by Weight Passing Sieve
1 inch (25.0 mm)	--
¾ inch (19.0 mm)	100
½ inch (12.5 mm)	90-100
3/8 inch (9.5 mm)	72-88
No. 4 (4.75 mm)	53-73
No. 8 (2.36 mm)	38-60
No. 16 (1.18 mm)	26-48
No. 30 (600 µm)	18-38
No. 50 (300 µm)	11-27
No. 100 (150 µm)	6-18
No. 200 (75 µm)	3-6
Minimum Voids in Mineral Aggregate (VMA)¹	15.0
Asphalt Percent:	
Stone or gravel	5.0-7.5
Slag	6.5-9.5
Recommended Minimum Construction Lift Thickness	2 inch

¹To achieve minimum VMA during production, the mix design needs to account for material breakdown during production.

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition.

401-3.4 Reclaimed asphalt pavement (RAP). Reclaimed asphalt shall consist of reclaimed asphalt pavement (RAP), coarse aggregate, fine aggregate, mineral filler, and asphalt. The RAP shall be of a consistent gradation and asphalt content and properties. When RAP is fed into the plant, the maximum RAP size shall not exceed one inch (25 mm). The reclaimed asphalt pavement mix shall be designed using procedures contained in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition. The percentage of asphalt in the RAP shall be established for the mixture design according to ASTM D2172 using the appropriate dust correction procedure. The JMF shall meet the requirements of paragraph 401-3.3. **Up to 20 percent RAP material in the bituminous surface course mix is allowable.** The amount of RAP shall be limited to 20 percent. In addition to the requirements of paragraph 401-3.3, the JMF shall indicate the percent of reclaimed asphalt pavement and the percent and grade of new asphalt binder. For the PG graded asphalt binder selected in 401-2.3, adjust as follows:

a. For 0-20% RAP, there is no change in virgin asphalt binder content.

b. For >20 to 30% RAP, select asphalt binder one grade softer, i.e., PG 64-22 would soften to PG 58-28.

RAP containing Coal Tar shall not be used. Coal Tar surface treatments must be removed prior to recycling underlying asphalt material.

Item D-751 Manholes, Catch Basins, Inlets and Inspection Holes

DESCRIPTION

751-1.1 This item shall consist of construction of manholes, catch basins, inlets, and inspection holes, in accordance with these specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the plans or required by the RPR.

MATERIALS

751-2.1 Brick. The brick shall conform to the requirements of ASTM C32, Grade MS.

751-2.2 Mortar. Mortar shall consist of one part Portland cement and two parts sand. The cement shall conform to the requirements of ASTM C150, Type I. The sand shall conform to the requirements of ASTM C144.

751-2.3 Concrete. Plain and reinforced concrete used in structures, connections of pipes with structures, and the support of structures or frames shall conform to the requirements of Item P-610.

751-2.4 Precast concrete pipe manhole rings. Precast concrete pipe manhole rings shall conform to the requirements of ASTM C478. Unless otherwise specified, the risers and offset cone sections shall have an inside diameter of not less than 36 inches (90 cm) nor more than 48 inches (120 cm). There shall be a gasket between individual sections and sections cemented together with mortar on the inside of the manhole. Gaskets shall conform to the requirements of ASTM C443.

751-2.5 Corrugated metal. Corrugated metal shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M36.

751-2.6 Frames, covers, and grates. The castings shall conform to one of the following requirements:

- a. ASTM A48, Class 35B: Gray iron castings
- b. ASTM A47: Malleable iron castings
- c. ASTM A27: Steel castings
- d. ASTM A283, Grade D: Structural steel for grates and frames
- e. ASTM A536, Grade 65-45-12: Ductile iron castings
- f. ASTM A897: Austempered ductile iron castings

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings, aircraft gear configuration and/or direct loading, specified.

Each frame and cover or grate unit shall be provided with fastening members to prevent it from being dislodged by traffic but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

751-2.7 Steps. The steps or ladder bars shall be gray or malleable cast iron or galvanized steel. The steps shall be the size, length, and shape shown on the plans and those steps that are not galvanized shall be given a coat of asphalt paint, when directed.

751-2.8 Precast inlet structures. Manufactured in accordance with and conforming to ASTM C913.

CONSTRUCTION METHODS

751-3.1 Unclassified excavation.

a. The Contractor shall excavate for structures and footings to the lines and grades or elevations, shown on the plans, or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the plans, shall be considered as approximately only; and the RPR may direct, in writing, changes in dimensions or elevations of footings necessary for a satisfactory foundation.

b. Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped, or serrated, as directed by the RPR. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. Where concrete will rest on a surface other than rock, the bottom of the excavation shall not be disturbed and excavation to final grade shall not be made until immediately before the concrete or reinforcing is placed.

c. The Contractor shall do all bracing, sheathing, or shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for the structure.

d. All bracing, sheathing, or shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall not disturb or damage finished masonry. The cost of removal shall be included in the unit price bid for the structure.

e. After excavation is completed for each structure, the Contractor shall notify the RPR. No concrete or reinforcing steel shall be placed until the RPR has approved the depth of the excavation and the character of the foundation material.

751-3.2 Brick structures.

a. **Foundations.** A prepared foundation shall be placed for all brick structures after the foundation excavation is completed and accepted. Unless otherwise specified, the base shall consist of reinforced concrete mixed, prepared, and placed in accordance with the requirements of Item P-610.

b. **Laying brick.** All brick shall be clean and thoroughly wet before laying so that they will not absorb any appreciable amount of additional water at the time they are laid. All brick shall be laid in freshly made mortar. Mortar not used within 45 minutes after water has been added shall be discarded. Retempering of mortar shall not be permitted. An ample layer of mortar shall be spread on the beds and a shallow furrow shall be made in it that can be readily closed by the laying of the brick. All bed and head joints shall be filled solid with mortar. End joints of stretchers and side or cross joints of headers shall be fully buttered with mortar and a shoved joint made to squeeze out mortar at the top of the joint. Any bricks that may be loosened after the mortar has taken its set, shall be removed, cleaned, and re-laid with fresh mortar. No broken or chipped brick shall be used in the face, and no spalls or bats shall be used except where necessary to shape around irregular openings or edges; in which case, full bricks shall be placed at ends or corners where possible, and the bats shall be used in the interior of the course. In making closures, no piece of brick shorter than the width of a whole brick shall be used; and wherever practicable, whole brick shall be used and laid as headers.

c. **Joints.** All joints shall be filled with mortar at every course. Exterior faces shall be laid up in advance of backing. Exterior faces shall be plastered or parged with a coat of mortar not less than 3/8 inch (9 mm) thick before the backing is laid up. Prior to parging, all joints on the back of face courses shall be cut flush. Unless otherwise noted, joints shall be not less than 1/4 inch (6 mm) nor more than 1/2 inch (12 mm) wide and the selected joint width shall be maintained uniform throughout the work.

d. Pointing. Face joints shall be neatly struck, using the weather-struck joint. All joints shall be finished properly as the laying of the brick progresses. When nails or line pins are used, the holes shall be immediately plugged with mortar and pointed when the nail or pin is removed.

e. Cleaning. Upon completion of the work all exterior surfaces shall be thoroughly cleaned by scrubbing and washing with water. If necessary to produce satisfactory results, cleaning shall be done with a 5% solution of muriatic acid which shall then be rinsed off with liberal quantities of water.

f. Curing and cold weather protection. The brick masonry shall be protected and kept moist for at least 48 hours after laying the brick. Brick masonry work or pointing shall not be done when there is frost on the brick or when the air temperature is below 50°F (10°C) unless the Contractor has, on the project ready to use, suitable covering and artificial heating devices necessary to keep the atmosphere surrounding the masonry at a temperature of not less than 60°F (16°C) for the duration of the curing period.

751-3.3 Concrete structures. Concrete structures which are to be cast-in-place within the project boundaries shall be built on prepared foundations, conforming to the dimensions and shape indicated on the plans. The construction shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

All invert channels shall be constructed and shaped accurately to be smooth, uniform, and cause minimum resistance to flowing water. The interior bottom shall be sloped to the outlet.

Shop drawings that include the structure load ratings shall be submitted by contractor for drainage structures within the aircraft operation zones to demonstrate that they meet design loads for Boeing 747-400 aircrafts.

751-3.4 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program. Shop drawings that include the structure load ratings shall be submitted by contractor for precast drainage structures within the aircraft operation zones to demonstrate structures meet design loads for Boeing 747-400 aircrafts.

Precast concrete structures shall conform to ASTM C478. Precast concrete structures shall be constructed on prepared or previously placed slab foundations conforming to the dimensions and locations shown on the plans. All precast concrete sections necessary to build a completed structure shall be furnished. The different sections shall fit together readily. Joints between precast concrete risers and tops shall be full-bedded in cement mortar and shall: (1) be smoothed to a uniform surface on both interior and exterior of the structure or (2) utilize a rubber gasket per ASTM C443. The top of the upper precast concrete section shall be suitably formed and dimensioned to receive the metal frame and cover or grate, or other cap, as required. Provision shall be made for any connections for lateral pipe, including drops and leads that may be installed in the structure. The flow lines shall be smooth, uniform, and cause minimum resistance to flow. The metal or metal encapsulated steps that are embedded or built into the side walls shall be aligned and placed in accordance to ASTM C478. When a metal ladder replaces the steps, it shall be securely fastened into position.

751-3.5 Corrugated metal structures. Corrugated metal structures shall be prefabricated. All standard or special fittings shall be furnished to provide pipe connections or branches with the correct dimensions and of sufficient length to accommodate connecting bands. The fittings shall be welded in place to the metal structures. The top of the metal structure shall be designed so that either a concrete slab or metal collar may be attached to allow the fastening of a standard metal frame and grate or cover. Steps or ladders shall be furnished as shown on the plans. Corrugated metal structures shall be constructed on prepared foundations, conforming to the dimensions and locations as shown on the plans. When indicated, the structures shall be placed on a reinforced concrete base.

751-3.6 Inlet and outlet pipes. Inlet and outlet pipes shall extend through the walls of the structures a sufficient distance beyond the outside surface to allow for connections. They shall be cut off flush with the wall on the inside surface of the structure, unless otherwise directed. For concrete or brick structures, mortar shall be placed around these pipes to form a tight, neat connection.

751-3.7 Placement and treatment of castings, frames, and fittings. All castings, frames, and fittings shall be placed in the positions indicated on the plans or as directed by the RPR, and shall be set true to line and elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

When frames or fittings are placed on previously constructed masonry, the bearing surface of the masonry shall be brought true to line and grade and shall present an even bearing surface so the entire face or back of the unit will come in contact with the masonry. The unit shall be set in mortar beds and anchored to the masonry as indicated on the plans or as directed by the RPR. All units shall set firm and secure.

After the frames or fittings have been set in final position, the concrete or mortar shall be allowed to harden for seven (7) days before the grates or covers are placed and fastened down.

Shop drawings that include the structure load ratings shall be submitted by contractor for castings and frames for drainage structures within the aircraft operation zones to demonstrate that they meet design loads for Boeing 747-400 aircrafts.

751-3.8 Installation of steps. The steps shall be installed as indicated on the plans or as directed by the RPR. When the steps are to be set in concrete, they shall be placed and secured in position before the concrete is placed. When the steps are installed in brick masonry, they shall be placed as the masonry is being built. The steps shall not be disturbed or used until the concrete or mortar has hardened for at least seven (7) days. After seven (7) days, the steps shall be cleaned and painted, unless they have been galvanized.

When steps are required with precast concrete structures they shall meet the requirements of ASTM C478. The steps shall be cast into the side of the sections at the time the sections are manufactured or set in place after the structure is erected by drilling holes in the concrete and cementing the steps in place.

When steps are required with corrugated metal structures, they shall be welded into aligned position at a vertical spacing of 12 inches (300 mm).

Instead of steps, prefabricated ladders may be installed. For brick or concrete structures, the ladder shall be held in place by grouting the supports in drilled holes. For metal structures, the ladder shall be secured by welding the top support to the structure and grouting the bottom support into drilled holes in the foundation or as directed by the RPR.

751-3.9 Backfilling.

a. After a structure has been completed, the area around it shall be backfilled with approved material, in horizontal layers not to exceed 8 inches (200 mm) in loose depth, and compacted to the density required in Item P-152. Each layer shall be deposited evenly around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

b. Backfill shall not be placed against any structure until approved by the RPR. For concrete structures, approval shall not be given until the concrete has been in place seven (7) days, or until tests establish that the concrete has attained sufficient strength to withstand any pressure created by the backfill and placing methods.

c. Backfill shall not be measured for direct payment. Performance of this work shall be considered an obligation of the Contractor covered under the contract unit price for the structure involved.

751-3.10 Cleaning and restoration of site. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankments, shoulders, or as approved by the RPR. The Contractor shall restore all disturbed areas to their original condition. The Contractor shall remove all tools and equipment, leaving the entire site free, clear, and in good condition.

METHOD OF MEASUREMENT

751-4.1 Manholes, catch basins, inlets, and inspection holes shall be measured by the unit.

751-4.2 Manhole/catch basin elevation adjustments shall be measured by the completed adjustment to the structure casting elevation to match construction finished grade, in place, completed, and accepted. Nominal casting elevation adjustment is +/- 9", and shall include elevation adjustment via adjustment rings and installation of new structure casting.

BASIS OF PAYMENT

751-5.1 The accepted quantities of manholes, catch basins, inlets, and inspection holes will be paid for at the contract unit price per each in place when completed. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials; furnishing and installation of such specials and connections to pipes and other structures as may be required to complete the item as shown on the plans; and for all labor equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

Item D-751	Drain Tile Access/Inspection Pit - per each
Item D-751	48 IN Dia. Manhole/Catch Basin - per each
Item D-751	60 IN Dia. Manhole/Catch Basin - per each
Item D-751	72 IN Dia. Manhole/Catch Basin - per each
Item D-751	84 IN Dia. Manhole/Catch Basin - per each
Item D-751	96 IN Dia. Manhole/Catch Basin - per each
Item D-751	Adjust Manhole/Catch Basin Casting – per each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A897	Standard Specification for Austempered Ductile Iron Castings
ASTM C32	Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
ASTM C478	Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM C913	Standard Specification for Precast Concrete Water and Wastewater Structures.
American Association of State Highway and Transportation Officials (AASHTO)	
AASHTO M36	Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains

END OF ITEM D-751

Part 13 – Lighting Installation

Item L-125 Installation of Airport Lighting Systems

DESCRIPTION

125-1.1 This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR.

EQUIPMENT AND MATERIALS

125-2.1 General.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not perform as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.

b. Manufacturer's certifications shall not relieve the Contractor of their responsibility to provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

c. All materials and equipment used shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made with arrows or circles (highlighting is not acceptable). The Contractor shall be responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in electronic PDF format, tabbed by specification section. The RPR reserves the right to reject any or all equipment, materials or procedures, which, in the RPR's opinion, does not meet the system design and the standards and codes, specified herein.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

EQUIPMENT AND MATERIALS

125-2.2 Conduit/Duct. Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

125-2.3 Cable and Counterpoise. Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.

125-2.4 Tape. Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88 respectively, as manufactured by 3M Company or an approved equal.

125-2.5 Cable Connections. Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

125-2.6 Retroreflective Markers. Not required.

125-2.7 Runway and Taxiway Lights. Runway and taxiway lights shall conform to the requirements of AC 150/5345-46. Lamps shall be of size and type indicated, or as required by fixture manufacturer for each lighting fixture required under this contract. Filters shall be of colors conforming to the specification for the light concerned or to the standard referenced.

Lights							
Type	Class	Mode	Option	Base	Filter	Transformer	Notes
L-861T(L)	2	2	4	L-867B	Blue	L-830	Taxiway Alpha 4/Alpha Center Edge Lights

125-2.8 Runway and Taxiway Signs. Runway and Taxiway Guidance Signs should conform to the requirements of AC 150/5345-44.

Signs					
Type	Size	Style	Class	Mode	Notes
L-858R(L)	2	2	2	2	Hold Sign
L-858L(L)	2	2	2	2	Location Sign
L-858Y(L)	2	2	2	2	Directional Sign

125-2.9 Runway End Identifier Light (REIL). Not used.

125-2.10 Precision Approach Path Indicator (PAPI). Not used.

125-2.11 Circuit Selector Cabinet. Not used.

125-2.12 Light Base and Transformer Housings. Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. Light bases shall be Type L-867 and L-868, and shall be provided as indicated on drawings or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures. See Specification "L-115 Electrical Manholes and Junction Structures.

125-2.13 Isolation Transformers. Isolation Transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47.

125-2.14 Other Electrical Equipment. Distribution transformers, oil switches, cutouts, relays, terminal blocks, transfer relays, circuit breakers, and all other regularly used commercial items of electrical equipment not covered by FAA equipment specifications and ACs shall conform to the applicable rulings and standards of the Institute of Electrical and Electronics Engineers (IEEE) or the National Electrical Manufacturers Association (NEMA). When specified, test reports from a testing laboratory indicating that the equipment meets the specifications shall be supplied. In all cases, equipment shall be new and a first-grade product. This equipment shall be supplied in the quantities required for the specific project and shall incorporate the electrical and mechanical characteristics specified in the proposal and plans. Equipment selected and installed by the Contractor shall maintain the interrupting current rating of the existing systems or specified rating whichever is greater.

125-2.15 Wire. Wire (in conduit) rated up to 5,000 volts shall be per AC 150/5345-7, Specification for L-824 Underground Electrical Cables for Airport Lighting Circuits. For ratings up to 600 volts, moisture and heat resistant thermoplastic wire conforming to Commercial Item Description A-A-59544A Type THWN-2 shall be used. The wires shall be of the type, size, number of conductors, and voltage shown in the plans or in the proposal.

- a. **Control Circuits.** Unless otherwise indicated on the plans, wire shall be not less than No. 12 American wire gauge (AWG) and shall be insulated for 600 volts.
- b. **Power Circuits.** 600 volts maximum – Wire shall be No. 6 AWG or larger and insulated for at least 600 volts.

INSTALLATION

125-3.1 Installation. The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and state and local code agencies having jurisdiction.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans.

The Contractor shall provide core-drilling as required to install the new in-pavement base cans and shall be incidental to the installation. Contractor shall coordinate locations with RPR prior to work and provide all necessary labor and equipment for a fully functioning system. Should base can fall within a close enough proximity to pavement jointing, lighting fixture block outs shall be provided as shown on drawings.

125-3.2 Testing. All lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

125-3.3 Shipping and Storage. Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

125-3.4 Elevated and In-pavement Lights. Water, debris, and other foreign substances shall be removed prior to installing fixture base and light.

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding material shall be removed. The holding device shall remain in place until sealant has reached its initial set.

METHOD OF MEASUREMENT

125-4.1 Constant Current Regulators will be measured by the number of each type and size installed as completed units, in place, ready for operation, and accepted by the RPR.

125-4.2 Runway and taxiway lights will be measured by the number of each type installed as completed units in place, ready for operation, and accepted by the RPR.

125-4.3 Guidance signs will be measured by the number of each type and size installed as completed units, in place, ready for operation, and accepted by the RPR.

125-4.4 Removal and salvage of airfield lighting fixtures and signs will be measured with lump sum and accepted by the RPR. Removal of base cans, isolation transformers, sign foundations, conduits, ductbanks, and wire and accepted by the RPR.

BASIS OF PAYMENT

125-5.1 Payment will be made at the Contract unit price for each complete runway or taxiway light, guidance sign, or constant current regulator installed by the Contractor and accepted by the Engineer. This payment will be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools and incidentals necessary to complete this item.

125-5.2 480/208V 250A, 24-Pole Panelboard shall be measured by each system installed as a completed unit, in place, ready for operation, including all required material as required in specification 13 34 40, and accepted by the RPR.

125-5.3 Electrical Distribution in Vault Building shall be measured by each system installed as a completed unit, in place, ready for operation, including all conduit, wire, connections to electrical equipment, and all miscellaneous materials as required for installation of the panelboard, and as accepted by the RPR.

Payment will be made under:

Item L-125-5.1 Removal of Existing Taxiway Edge Light Fixtures and Signs, Including Base Can, Isolation Transformer, Sign Foundation, Conduit, Ductbank, and Wire – Per Lump Sum

- Item L-125-5.2 L-861T(L) Medium Intensity Taxiway Edge Light (Without Arctic Kit), Blue Lens Installed on New L-867-B Galvanized Base Can (Includes Fixtures, Transformer, and Base Can) – Per Each
- Item L-125-5.3 L-858(L) Guidance Sign, Size 2, Including Foundation, Isolation Transformer, Wire, Base Can, and Conduit – Per Each
- Item L-125-5.4 L-829 4kW Constant Current Regulator – Per Each
- Item L-125-5.5 Temporarily Remove Existing Runway Light Fixture, Base Can, Cable, Conduit, and Isolation Transformer, and Replace Light Fixture on New Base Can with New Isolation Transformer in Later Phase – Per Each
- Item L-125-5.6 Remove Existing L-861T(L) Taxiway Edge Light and Isolation Transformer in Existing Base Can, and Relocate or Return to Owner – Per Each
- Item L-125-5.7 Temporarily Remove Existing Sign Fixture, including Base Can, Cable, Conduit, and Isolation Transformer, and Replace Sign Fixture on New Base Can with New Isolation Transformer, Base Can, and Foundation in Later Phase – Per Each
- Item L-125-5.8 480V, 3-Phase / 3-Wire 250A, 42-Pole MLO Panelboard
- Item L-125-5.9 Electrical Distribution in Existing Vault Building

MATERIAL REQUIREMENTS

- AC 150/5345-5 Circuit Selector Switch
- AC 150/5345-26 L-823 Plug and Receptacle, Cable Connectors
- AC 150/5345-28 Precision Approach Path Indicator (PAPI) Systems
- AC 150/5345-42 Airport Light Bases, Transformer Houses, Junction Boxes and Accessories
- AC 150/5345-44 Taxiway and Runway Signs
- AC 150/5345-46 Runway and Taxiway Light Fixtures
- AC 150/5345-47 Isolation Transformers for Airport Lighting Systems
- AC 150/5345-51 Discharge-Type Flasher Equipment

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

- AC 150/5340-18 Standards for Airport Sign Systems
- AC 150/5340-26 Maintenance of Airport Visual Aid Facilities
- AC 150/5340-30 Design and Installation Details for Airport Visual Aids

AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-28	Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5345-44	Specification for Runway and Taxiway Signs
AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47	Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-51	Specification for Discharge-Type Flashing Light Equipment
AC 150/5345-53	Airport Lighting Equipment Certification Program
Engineering Brief (EB)	
EB No. 67	Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures

END OF ITEM L-125

Item T-901 Seeding

DESCRIPTION

901-1.1 This item shall consist of soil preparation, seeding, and fertilizing the areas shown on the plans or as directed by the RPR in accordance with these specifications.

MATERIALS

901-2.1 Seed. The species and application rates of grass, legume, and cover-crop seed furnished shall be those stipulated herein. Seed shall conform to the requirements of Federal Specification JJJ-S-181, Federal Specification, Seeds, Agricultural.

Seed shall be furnished separately or in mixtures in standard containers labeled in conformance with the Agricultural Marketing Service (AMS) Seed Act and applicable state seed laws with the seed name, lot number, net weight, percentages of purity and of germination and hard seed, and percentage of maximum weed seed content clearly marked for each kind of seed. The Contractor shall furnish the RPR duplicate signed copies of a statement by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within six (6) months of date of delivery. This statement shall include: name and address of laboratory, date of test, lot number for each kind of seed, and the results of tests as to name, percentages of purity and of germination, and percentage of weed content for each kind of seed furnished, and, in case of a mixture, the proportions of each kind of seed. Wet, moldy, or otherwise damaged seed will be rejected.

Seeds shall be applied as follows:

Fine Fescue 10% Creeping Red Fescue, Fine Fescue 10% Creeping Red Fescue, Fine Fescue 50% Sheeps Fescue, Fine Fescue 20% Chewings Red Fescue, Fine Fescue 10% Hard Red Fescue (Cut Less Special) or approved equal.

Like or better cultivars may be used based on availability and market conditions:

Seed Properties and Rate of Application

Seed	Minimum Seed Purity (Percent)	Minimum Germination (Percent)	Rate of Application lb/acre (or lb/1,000 S.F.)
Cut Less (Special), or approved equal	*	*	6 lb/1,000 SF

901-2.2 Lime. Not required.

901-2.3 Fertilizer. Fertilizer shall be standard commercial fertilizers supplied separately or in mixtures containing the percentages of total nitrogen, available phosphoric acid, and water-soluble potash. They shall be applied at the rate and to the depth specified, and shall meet the requirements of applicable state laws. They shall be furnished in standard containers with name, weight, and guaranteed analysis of contents clearly marked thereon. No cyanamide compounds or hydrated lime shall be permitted in mixed fertilizers.

The fertilizers may be supplied in one of the following forms:

- a. A dry, free-flowing fertilizer suitable for application by a common fertilizer spreader;
- b. A finely-ground fertilizer soluble in water, suitable for application by power sprayers; or
- c. A granular or pellet form suitable for application by blower equipment.

Fertilizers shall be **slow release Nitrogen type, NPK: 20-5-10** commercial fertilizer and shall be spread at the rate of **150 lb/acre**.

901-2.4 Soil for repairs. The soil for fill and topsoiling of areas to be repaired shall be at least of equal quality to that which exists in areas adjacent to the area to be repaired. The soil shall be relatively free from large stones, roots, stumps, or other materials that will interfere with subsequent sowing of seed, compacting, and establishing turf, and shall be approved by the RPR before being placed.

CONSTRUCTION METHODS

901-3.1 Advance preparation and cleanup. After grading of areas has been completed and before applying fertilizer and ground limestone, areas to be seeded shall be raked or otherwise cleared of stones larger than 2 inches (50 mm) in any diameter, sticks, stumps, and other debris that might interfere with sowing of seed, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes has occurred after the completion of grading and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage include filling gullies, smoothing irregularities, and repairing other incidental damage.

An area to be seeded shall be considered a satisfactory seedbed without additional treatment if it has recently been thoroughly loosened and worked to a depth of not less than 5 inches (125 mm) as a result of grading operations and, if immediately prior to seeding, the top 3 inches (75 mm) of soil is loose, friable, reasonably free from large clods, rocks, large roots, or other undesirable matter, and if shaped to the required grade.

When the area to be seeded is sparsely sodded, weedy, barren and unworked, or packed and hard, any grass and weeds shall first be cut or otherwise satisfactorily disposed of, and the soil then scarified or otherwise loosened to a depth not less than 5 inches (125 mm). Clods shall be broken and the top 3 inches (75 mm) of soil shall be worked into a satisfactory seedbed by discing, or by use of cultipackers, rollers, drags, harrows, or other appropriate means.

901-3.2 Dry application method.

a. Liming. Not required.

b. Fertilizing. Following advance preparations and cleanup fertilizer shall be uniformly spread at the rate that will provide not less than the minimum quantity stated in paragraph 901-2.3.

c. Seeding. Grass seed shall be sown at the rate specified in paragraph 901-2.1 immediately after fertilizing. The fertilizer and seed shall be raked within the depth range stated in the special provisions. Seeds of legumes, either alone or in mixtures, shall be inoculated before mixing or sowing, in accordance with the instructions of the manufacturer of the inoculant. When seeding is required at other than the seasons shown on the plans or in the special provisions, a cover crop shall be sown by the same methods required for grass and legume seeding.

d. Rolling. After the seed has been properly covered, the seedbed shall be immediately compacted by means of an approved lawn roller, weighing 40 to 65 pounds per foot (60 to 97 kg per meter) of width for clay soil (or any soil having a tendency to pack), and weighing 150 to 200 pounds per foot (223 to 298 kg per meter) of width for sandy or light soils.

901-3.3 Wet application method.

a. General. The Contractor may elect to apply seed and fertilizer (and lime, if required) by spraying them on the previously prepared seedbed in the form of an aqueous mixture and by using the methods and equipment described herein. The rates of application shall be as specified in the special provisions.

b. Spraying equipment. The spraying equipment shall have a container or water tank equipped with a liquid level gauge calibrated to read in increments not larger than 50 gallons (190 liters) over the entire range of the tank capacity, mounted so as to be visible to the nozzle operator. The container or tank shall also be equipped with a mechanical power-driven agitator capable of keeping all the solids in the mixture in complete suspension at all times until used.

The unit shall also be equipped with a pressure pump capable of delivering 100 gallons (380 liters) per minute at a pressure of 100 lb / sq inches (690 kPa). The pump shall be mounted in a line that will recirculate the mixture through the tank whenever it is not being sprayed from the nozzle. All pump passages and pipe lines shall be capable of providing clearance for 5/8 inch (16 mm) solids. The power unit for the pump and agitator shall have controls mounted so as to be accessible to the nozzle operator. There shall be an indicating pressure gauge connected and mounted immediately at the back of the nozzle.

The nozzle pipe shall be mounted on an elevated supporting stand in such a manner that it can be rotated through 360 degrees horizontally and inclined vertically from at least 20 degrees below to at least 60 degrees above the horizontal. There shall be a quick-acting, three-way control valve connecting the recirculating line to the nozzle pipe and mounted so that the nozzle operator can control and regulate the amount of flow of mixture delivered to the nozzle. At least three different types of nozzles shall be supplied so that mixtures may be properly sprayed over distance varying from 20 to 100 feet (6 to 30 m). One shall be a close-range ribbon nozzle, one a medium-range ribbon nozzle, and one a long-range jet nozzle. For ease of removal and cleaning, all nozzles shall be connected to the nozzle pipe by means of quick-release couplings.

In order to reach areas inaccessible to the regular equipment, an extension hose at least 50 feet (15 m) in length shall be provided to which the nozzles may be connected.

c. Mixtures. Lime, if required, shall be applied separately, in the quantity specified, prior to the fertilizing and seeding operations. Not more than 220 pounds (100 kg) of lime shall be added to and mixed with each 100 gallons (380 liters) of water. Seed and fertilizer shall be mixed together in the relative proportions specified, but not more than a total of 220 pounds (100 kg) of these combined solids shall be added to and mixed with each 100 gallons (380 liters) of water.

All water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances harmful to plant life. The Contractor shall identify to the RPR all sources of water at least two (2) weeks prior to use. The RPR may take samples of the water at the source or from the tank at any time and have a laboratory test the samples for chemical and saline content. The Contractor shall not use any water from any source that is disapproved by the RPR following such tests.

All mixtures shall be constantly agitated from the time they are mixed until they are finally applied to the seedbed. All such mixtures shall be used within two (2) hours from the time they were mixed or they shall be wasted and disposed of at approved locations.

d. Spraying. Lime, if required, shall be sprayed only upon previously prepared seedbeds. After the applied lime mixture has dried, the lime shall be worked into the top 3 inches (75 mm), after which the seedbed shall again be properly graded and dressed to a smooth finish.

Mixtures of seed and fertilizer shall only be sprayed upon previously prepared seedbeds on which the lime, if required, shall already have been worked in. The mixtures shall be applied by means of a high-pressure spray that shall always be directed upward into the air so that the mixtures will fall to the ground

like rain in a uniform spray. Nozzles or sprays shall never be directed toward the ground in such a manner as might produce erosion or runoff.

Particular care shall be exercised to ensure that the application is made uniformly and at the prescribed rate and to guard against misses and overlapped areas. Proper predetermined quantities of the mixture in accordance with specifications shall be used to cover specified sections of known area.

Checks on the rate and uniformity of application may be made by observing the degree of wetting of the ground or by distributing test sheets of paper or pans over the area at intervals and observing the quantity of material deposited thereon.

On surfaces that are to be mulched as indicated by the plans or designated by the RPR, seed and fertilizer applied by the spray method need not be raked into the soil or rolled. However, on surfaces on which mulch is not to be used, the raking and rolling operations will be required after the soil has dried.

901-3.4 Maintenance of seeded areas. The Contractor shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the RPR. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading and reseeding as directed. The Contractor shall mow, water as directed, and otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

When either the dry or wet application method outlined above is used for work done out of season, it will be required that the Contractor establish a good stand of grass of uniform color and density to the satisfaction of the RPR. A grass stand shall be considered adequate when bare spots are one square foot (0.01 sq m) or less, randomly dispersed, and do not exceed 3% of the area seeded.

METHOD OF MEASUREMENT

901-4.1 The quantity of seeding to be paid for shall be the number of units **per acre** measured on the ground surface, completed and accepted.

BASIS OF PAYMENT

901-5.1 Payment shall be made at the contract unit price per acre (sq m) or fraction thereof, which price and payment shall be full compensation for furnishing and placing all material and for all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this item.

Payment will be made under:

Item 901-5.1	Seeding (Including Fertilizer) - per acre
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REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C602	Standard Specification for Agricultural Liming Materials
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Federal Specifications (FED SPEC)

FED SPEC	JJJ-S-181, Federal Specification, Seeds, Agricultural
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Advisory Circulars (AC)

AC 150/5200-33 Hazardous Wildlife Attractants on or Near Airports

FAA/United States Department of Agriculture

Wildlife Hazard Management at Airports, A Manual for Airport Personnel

END OF ITEM T-901

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STATEMENT OF ESTIMATED QUANTITIES

LINE NO.	ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY			FINAL QUANTITY				
				AIP ELIGIBLE FUNDING	AIP INELIGIBLE FUNDING		TOTAL	AIP ELIGIBLE FUNDING	AIP INELIGIBLE FUNDING		TOTAL
					ANG	DAA			ANG	DAA	
SCHEDULE A - TAXIWAY A RECONSTRUCTION, PHASE 3 (BASE BID)											
1	40-05	MAINTENANCE & RESTORATION OF HAUL ROADS	LS	1	0	0	1				
2	40-08	RESTORATION OF BATCH PLANT AND CONTRACTOR STORAGE AREAS	LS	1	0	0	1				
3	50-06	CONSTRUCTION LAYOUT & STAKING	LS	1	0	0	1				
4	60-05	FIELD OFFICE	LS	1	0	0	1				
5	70-08	TRAFFIC PROVISIONS/AIRPORT SECURITY & DEVICES/PHASING	LS	1	0	0	1				
6	70-10	ORANGE CONSTRUCTION FENCE	LF	5480	0	0	5480				
7	02 41 35	REMOVE PAVEMENT MARKING BY WATER BLASTING	SF	6060	0	0	6060				
8	02 41 35	REMOVE PAVEMENT MARKING, GROUND OFF	SF	50	0	0	50				
9	32 12 16	PLANT-MIXED ASPHALT PAVEMENT	TON	3090	1660	0	4750				
10	C-100	CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)	LS	1	0	0	1				
11	C-102	ROCK CONSTRUCTION ENTRANCE (INCLUDES MAINTENANCE AND REMOVAL)	EA	3	0	0	3				
12	C-102	SILT FENCE, TYPE PREASSEMBLED (INCLUDES MAINTENANCE AND REMOVAL)	LF	18825	0	0	18825				
13	C-102	FILTER LOG, TYPE WOOD-FIBER BIOROLL (INCLUDES MAINTENANCE AND REMOVAL)	LF	500	0	0	500				
14	C-102	EROSION CONTROL BLANKET, CATEGORY 3N (WOOD FIBER HV) (INCLUDES MAINTENANCE)	SY	100	0	0	100				
15	C-102	INLET PROTECTION, TYPE B (INCLUDES MAINTENANCE AND REMOVAL)	EA	72	0	0	72				
16	C-105	MOBILIZATION	LS	1	0	0	1				
17	D-701	REINFORCED CONCRETE PIPE (RCP), 12" CLASS III	LF	560	0	0	560				
18	D-701	REINFORCED CONCRETE PIPE (RCP), 15" CLASS III	LF	712	0	0	712				
19	D-701	REINFORCED CONCRETE PIPE (RCP), 18" CLASS III	LF	1312	0	0	1312				
20	D-701	REINFORCED CONCRETE PIPE (RCP), 24" CLASS III	LF	136	0	0	136				
21	D-701	REINFORCED CONCRETE PIPE (RCP), 30" CLASS III	LF	144	0	0	144				
22	D-701	REINFORCED CONCRETE PIPE (RCP), 42" CLASS III	LF	456	0	0	456				
23	D-705	DRAIN TILE (6" PERFORATED, INCLUDING TRENCH, BACKFILL, FABRIC)	LF	4500	0	0	4500				
24	D-705	DRAIN TILE (6" SOLID, INCLUDING TRENCH, BACKFILL, FABRIC)	LF	750	0	0	750				
25	D-751	DRAIN TILE ACCESS/INSPECTION PIT	EA	24	0	0	24				
26	D-751	MANHOLE / CATCH BASIN 48" DIA.	EA	15	0	0	15				
27	D-751	MANHOLE / CATCH BASIN 72" DIA.	EA	2	0	0	2				
28	D-751	MANHOLE / CATCH BASIN 84" DIA.	EA	3	0	0	3				
29	D-751	ADJUST MANHOLE / CATCH BASIN CASTING	EA	5	0	0	5				
30	L-108-5.1	NO. 8 AWG, 5 KV, L-824, TYPE C CABLE, INSTALLED IN DUCT BANK OR CONDUIT	LF	45950	0	0	45950				
31	L-108-5.2	NO. 6 AWG, SOLID, BARE COUNTERPOISE WIRE, INSTALLED IN TRENCH, ABOVE THE DUCT BANK OR CONDUIT, INCLUDING CONNECTIONS/TERMINATIONS, GROUND RODS AND GROUND CONNECTORS	LF	9500	0	0	9500				
32	L-108-5.3	2-#8 AWG AND 1-#8 GND, XHHW, INSTALLED IN TRENCH OR CONDUIT	LF	675	0	0	675				
33	L-110-5.1	NON-ENCASED ELECTRICAL CONDUIT, 1-WAY 2-INCH, PVC SCHEDULE 40	LF	7700	0	0	7700				
34	L-110-5.2	CONCRETE ENCASED ELECTRICAL CONDUIT, 2-WAY 2-INCH, PVC SCHEDULE 40	LF	550	0	0	550				
35	L-110-5.3	CONCRETE ENCASED ELECTRICAL CONDUIT, 6-WAY 4-INCH, PVC SCHEDULE 40	LF	1250	0	0	1250				
36	L-110-5.4	DRAIN LINE CONNECTION TO STORM STRUCTURE	EA	4	0	0	4				
37	L-110-5.5	1-2" HDPE DIRECTIONAL BORE	LF	350	0	0	350				
38	L-115-5.1	PRECAST AIRCRAFT-RATED ELECTRICAL HANDHOLE	EA	4	0	0	4				
39	L-115-5.3	BASE PLATE PLACED ON EXISTING L-867 BASE CAN	EA	2	0	0	2				
40	L-125-5.1	REMOVAL OF EXISTING TAXIWAY EDGE LIGHT FIXTURES AND SIGNS, INCLUDING BASE CAN, ISOLATION TRANSFORMER, SIGN FOUNDATION, CONDUIT, DUCTBANK, AND WIRE	LS	1	0	0	1				
41	L-125-5.2	L-861(L) MEDIUM INTENSITY TAXIWAY EDGE LIGHT (WITHOUT ARCTIC KIT), BLUE LENS INSTALLED ON NEW L-867-B GALVANIZED BASE CAN (INCLUDES FIXTURE, TRANSFORMER, AND BASE CAN)	EA	82	0	0	82				
42	L-125-5.3	L-858(L) GUIDANCE SIGN, SIZE 2, INCLUDING FOUNDATION, ISOLATION TRANSFORMER, WIRE, BASE CAN, AND CONDUIT	EA	14	0	0	14				
43	L-125-5.4	L-829 4KW CONSTANT CURRENT REGULATOR	EA	2	0	0	2				
44	L-125-5.5	TEMPORARILY REMOVE EXISTING RUNWAY LIGHT FIXTURE, BASE CAN, CABLE, CONDUIT, AND ISOLATION TRANSFORMER, AND REPLACE LIGHT FIXTURE ON NEW BASE CAN WITH NEW ISOLATION TRANSFORMER IN LATER PHASE	EA	2	0	0	2				
45	L-125-5.6	REMOVE EXISTING L-861(L) TAXIWAY EDGE LIGHT AND ISOLATION TRANSFORMER IN EXISTING BASE CAN, AND RELOCATE OR RETURN TO OWNER	EA	2	0	0	2				

STATEMENT OF ESTIMATED QUANTITIES

46	L-125-5.7	TEMPORARILY REMOVE EXISTING SIGN FIXTURE, INCLUDING BASE CAN, CABLE, CONDUIT, AND ISOLATION TRANSFORMER, AND REPLACE SIGN FIXTURE ON NEW BASE CAN WITH NEW ISOLATION TRANSFORMER, BASE CAN, AND FOUNDATION IN LATER PHASE	EA	1	0	0	1		
47	L-125-5.8	480V, 3-PHASE / 3-WIRE 250A, 42-POLE MLO PANELBOARD	EA	1	0	0	1		
48	L-125-5.9	ELECTRICAL DISTRIBUTION IN VAULT BUILDING	LS	1	0	0	1		
49	P-101	SAWING BITUMINOUS PAVEMENT (FULL DEPTH)	LF	3075	0	0	3075		
50	P-101	REMOVE BITUMINOUS PAVEMENT (FULL DEPTH)	SY	41625	0	0	41625		
51	P-101	MILL BITUMINOUS PAVEMENT (DEPTH VARIES)	SY	1150	0	0	1150		
52	P-101	SAWING CONCRETE PAVEMENT (FULL DEPTH)	LF	225	0	0	225		
53	P-101	REMOVE CONCRETE PAVEMENT (FULL DEPTH)	SY	240	0	0	240		
54	P-101	REMOVE STORM PIPE	LF	4560	0	0	4560		
55	P-101	REMOVE STORM STRUCTURE	EA	25	0	0	25		
56	P-101	REMOVE DRAIN TILE CLEANOUT	EA	14	0	0	14		
57	P-101	REMOVE DRAIN TILE	LF	2450	0	0	2450		
58	S-100.1	OIL WATER SEPERATOR REMOVALS (CONTAMINATED)	LS	0	0	1	1		
59	S-100.2	OIL WATER SEPERATOR SEDIMENT DISPOSAL (CONTAMINATED)	TON	0	0	150	150		
60	P-152	COMMON EXCAVATION (EV)	CY	43400	4270	2130	49800		
61	P-152	UNCLASSIFIED OVER EXCAVATION (EV) (INCLUDES REMOVAL AND REPLACEMENT OF UNSUITABLE MATERIAL WITH SUITABLE MATERIAL (P-154) AS DIRECTED BY ENGINEER, AND ALSO INCLUDES SUBGRADE PROOF ROLLING)	CY	1000	0	0	1000		
62	P-152	MUCK EXCAVATION (EV)	CY	350	0	0	350		
63	P-152	SUBGRADE PREPARATION (INCLUDES SUBGRADE PROOF ROLLING)	SY	27070	6460	1420	34950		
64	P-152	ROCK EXCAVATION	CY	50	0	0	50		
65	P-154	GRANULAR BORROW (CV)	CY	14420	2930	870	18220		
66	P-154	GEOTEXTILE FABRIC, TYPE Y	SY	26790	6460	1420	34670		
67	P-209	CRUSHED AGGREGATE BASE COURSE (CV)	CY	5720	1110	480	7310		
68	P-401	BITUMINOUS SURFACE COURSE	TON	720	0	170	890		
69	P-401	BITUMINOUS BASE COURSE	TON	1560	0	330	1890		
70	P-403	BITUMINOUS SURFACE COURSE	TON	1150	80	0	1230		
71	P-403	BITUMINOUS BASE COURSE	TON	1150	80	0	1230		
72	P-501	CEMENT CONCRETE PAVEMENT, 13"	SY	7800	5210	0	13010		
73	P-501	CEMENT CONCRETE PAVEMENT, REINFORCED 13"	SY	2470	620	0	3090		
74	P-603	BITUMINOUS TACK COAT	GAL	1650	330	150	2130		
75	P-604	COMPRESSION JOINT SEALS FOR CONCRETE	LF	14100	6200	0	20300		
76	P-605	JOINT SEALING FILLER	LF	3190	0	0	3190		
77	P-620	RUNWAY & TAXIWAY PAVEMENT MARKING	SF	39850	0	0	39850		
78	P-620	REFLECTIVE MEDIA	LB	2450	0	0	2450		
79	T-901	SEEDING (INCLUDING FERTILIZER)	ACRE	14.50	0.00	0.00	14.50		
80	T-905	SELECT TOPSOIL BORROW (IMPORT) (CV)	CY	500	0	0	500		
81	T-908	HYDROMULCHING	ACRE	14.50	0.00	0.00	14.50		

SEQ NOTES - SCHEDULE A

GENERAL: TEMPORARY SANITARY FACILITIES, WATER FOR DUST CONTROL, AND TEMPORARY WATER SUPPLY FOR CONSTRUCTION OPERATIONS ARE CONSIDERED INCIDENTAL TO OTHER ITEMS OF PROJECT WORK.

GENERAL: ANY FAA, AIRPORT, PRIVATE UTILITY, OR 148TH FW CABLES THAT ARE SCHEDULED TO REMAIN SHALL BE LOCATED VIA HYDRO-EXCAVATION PRIOR TO EXCAVATING OPERATIONS. ALL UTILITIES REQUESTED TO BE LOCATED BY FAA SHALL BE HYDRO-EXCAVATED. ANTICIPATE 16-HOURS OF HYDROEXCAVATION EFFORT, INCIDENTAL TO THE EXCAVATION AND LOCATING WORK.

ITEM 2: RESTORATION INCLUDES GRADING, TURF ESTABLISHMENT, AND ANY OTHER MEASURES REQUIRED TO RETURN THE AREA TO PRE-CONSTRUCTION CONDITIONS OR BETTER, AS APPROVED BY ENGINEER.

ITEM 5: INCLUDES ALL TRAFFIC CONTROL SIGNAGE, BARRICADES, TEMPORARY FENCING, TRAFFIC CONTROL DEVICES, AND ALL ITEMS PERTAINING TO SECURITY, AND PHASING.

ITEM 16: MOBILIZATION SHALL BE LIMITED TO 10-PERCENT OF THE TOTAL PROJECT COST. FURNISHING, INSTALLING, AND REMOVAL OF ELECTRICAL JUMPERS REQUIRED FOR TEMPORARY ELECTRICAL CONSTRUCTION IS CONSIDERED INCIDENTAL TO THE WORK OF MOBILIZATION.

ITEM 17-22: CONNECTIONS TO EXISTING STORM DRAIN PIPE, STRUCTURE, DRAIN TILE, INSPECTION PIT, AND CLEANOUT ARE ALL INCIDENTAL TO THESE PAY ITEMS.

ITEM 23-24: CONNECTIONS TO EXISTING STORM DRAIN PIPE, STRUCTURE, DRAIN TILE, INSPECTION PIT, AND CLEANOUT ARE ALL INCIDENTAL TO THESE PAY ITEMS. ALL ITEMS REQUIRED FOR DRAIN TILE (TRENCHING, FILTER MATERIAL, FABRIC, CONNECTIONS, BACKFILLING, AND ASSOCIATED COMPACTION) ARE INCIDENTAL TO ITEM.

ITEM 25-28: CONNECTIONS TO EXISTING STORM DRAIN PIPE, STRUCTURE, DRAIN TILE, INSPECTION PIT, AND CLEANOUT ARE ALL INCIDENTAL TO THESE PAY ITEMS.

ITEM 29: WORK INCLUDES ADJUSTMENT OF EXISTING STORM STRUCTURE TO FINISHED GRADE, INCLUDING ANY REQUIRED MODIFICATIONS TO EXISTING STRUCTURE AND INSTALLATION OF NEW CASTING.

ITEM 50: WORK INCLUDES REMOVAL OF BITUMINOUS PAVEMENT AND ANY UNDERLYING CONCRETE PAVEMENT LAYERS, REGARDLESS OF ACTUAL PAVEMENT THICKNESS ENCOUNTERED. APPENDIX A GEOTECHNICAL REPORT REFLECTS EXISTING COMPOSITE PAVEMENT SECTIONS WERE OBSERVED IN SOIL BORINGS AND PAVEMENT CORES FOR PAVEMENTS SOUTH OF TAXIWAY A.

ITEM 54: REQUIRED PIPE/STRUCTURE BULKHEADS ARE INCIDENTAL TO PIPE REMOVAL. STORM SEWER PIPE TO BE REMOVED RANGES IN SIZE BETWEEN 8" AND 42" DIAMETER PIPE. APPROXIMATELY 600 LF OF STORM SEWER TO BE REMOVED IS BETWEEN 30" AND 42" IN DIAMETER.

ITEM 58-59: SEE SHEET C5.17 FOR ADDITIONAL INFORMATION.

ITEM 60: SEE EARTHWORK SUMMARY ON SHEET G6.00.

ITEM 61: SEE EARTHWORK SUMMARY ON SHEET G6.00. ITEM INCLUDES MATERIAL EXCAVATED BELOW THE TYPICAL SECTION, AS DIRECTED BY ENGINEER. EXCAVATED MATERIAL TO BECOME PROPERTY OF CONTRACTOR, REPLACEMENT OF EXCAVATED MATERIAL WITH SUITABLE GRANULAR MATERIAL WILL BE INCIDENTAL TO THE UNCLASSIFIED OVER EXCAVATION.

ITEM 62: SEE EARTHWORK SUMMARY ON SHEET G6.00.

ITEM 64: SEE EARTHWORK SUMMARY ON SHEET G6.00.

ITEM 80: ALL ON-SITE STRIPPING, SALVAGING, STOCKPILING, REPLACING AND SPREADING QUANTITY WILL BE PAID FOR UNDER COMMON EXCAVATION PRIOR TO THE PLACEMENT OF TOPSOIL BORROW (OBTAINED OFF-SITE) BY CONTRACTOR.

ITEMS 30-48: NO PRICE ADJUSTMENT WILL BE MADE BASED ON PERCENTAGE OF QUANTITY USED. THE ENGINEER WILL PROVIDE A NOTICE TO PROCEED SPECIFICALLY FOR WIRE & CABLE ITEMS PRIOR TO ORDERING TO ENSURE THE CORRECT AMOUNT IS OBTAINED.

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I HEREBY CERTIFY THAT I AM AN ARCHITECT, ENGINEER, SURVEYOR AND THAT I AM A LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

James R. Nelson
 James R. Nelson, P.E.
 JRN
 DATE: JUNE 13, 2023 LICENSE NO. 2828M

DULUTH INTERNATIONAL AIRPORT (DLH)
 TAXIWAY A
 RECONSTRUCTION - PHASE 3
 DULUTH, MINNESOTA

7-6-2023 ADDENDUM 1
 7-3-2023 ADDENDUM 2
 DATE DESCRIPTION
 MARK REVISIONS

DULH 168804
 STATE PROJECT NO. A601-205
 ISSUE DATE: JUNE 13, 2023 JRN AA
 DESIGNED BY
 DRAWN BY
 Short Elliott Hendrickson, Inc. © (SEH)
 © 2023 Short Elliott Hendrickson, Inc.

SHEET TITLE
 STATEMENT OF
 ESTIMATED
 QUANTITIES -
 SCHEDULE A

STATEMENT OF ESTIMATED QUANTITIES

LINE NO.	ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY			FINAL QUANTITY			
				AIP ELIGIBLE FUNDING	AIP INELIGIBLE FUNDING		AIP ELIGIBLE FUNDING	AIP INELIGIBLE FUNDING		TOTAL
					ANG	DAA		ANG	DAA	
SCHEDULE B - TAXIWAY A RECONSTRUCTION, PHASE 3 (BID ALTERNATE)										
82	40-05	MAINTENANCE & RESTORATION OF HAUL ROADS	LS	1	0	0	1			
83	50-06	CONSTRUCTION LAYOUT & STAKING	LS	1	0	0	1			
84	60-05	FIELD OFFICE	LS	1	0	0	1			
85	70-08	TRAFFIC PROVISIONS/AIRPORT SECURITY & DEVICES/PHASING	LS	1	0	0	1			
86	70-10	ORANGE CONSTRUCTION FENCE	LF	3550	0	0	3550			
87	02 41 35	REMOVE PAVEMENT MARKING BY WATER BLASTING	SF	860	0	0	860			
88	C-100	CONTRACTOR QUALITY CONTROL PROGRAM (CQCP)	LS	1	0	0	1			
89	C-102	ROCK CONSTRUCTION ENTRANCE (INCLUDES MAINTENANCE AND REMOVAL)	EA	1	0	0	1			
90	C-102	SILT FENCE, TYPE PREASSEMBLED (INCLUDES MAINTENANCE AND REMOVAL)	LF	1650	0	0	1650			
91	C-102	FILTER LOG, TYPE WOOD FIBER BIOROLL (INCLUDES MAINTENANCE AND REMOVAL)	LF	500	0	0	500			
92	C-102	EROSION CONTROL BLANKET, CATEGORY 3N (WOOD FIBER HV) (INCLUDES MAINTENANCE)	SY	100	0	0	100			
93	C-102	INLET PROTECTION, TYPE B (INCLUDES MAINTENANCE AND REMOVAL)	EA	33	0	0	33			
94	C-105	MOBILIZATION	LS	1	0	0	1			
95	D-701	REINFORCED CONCRETE PIPE (RCP), 18" CLASS III	LF	760	0	0	760			
96	D-701	REINFORCED CONCRETE PIPE (RCP), 18" CLASS III FES W/ TRASH GUARD	EA	2	0	0	2			
97	D-701	REINFORCED CONCRETE PIPE (RCP), 24" CLASS III	LF	248	0	0	248			
98	D-701	REINFORCED CONCRETE PIPE (RCP), 36" CLASS III	LF	408	0	0	408			
99	D-705	DRAIN TILE (6" PERFORATED, INCLUDING TRENCH, BACKFILL, FABRIC)	LF	2100	0	0	2100			
100	D-705	DRAIN TILE (6" SOLID, INCLUDING TRENCH, BACKFILL, FABRIC)	LF	200	0	0	200			
101	D-751	DRAIN TILE ACCESS/INSPECTION PIT	EA	12	0	0	12			
102	D-751	MANHOLE / CATCH BASIN 48" DIA.	EA	8	0	0	8			
103	D-751	MANHOLE / CATCH BASIN 60" DIA.	EA	1	0	0	1			
104	D-751	MANHOLE / CATCH BASIN 72" DIA.	EA	5	0	0	5			
105	D-751	ADJUST MANHOLE / CATCH BASIN CASTING	EA	1	0	0	1			
106	L-108-5.1	NO. 8 AWG, 5 KV, L-824, TYPE C CABLE, INSTALLED IN DUCT BANK OR CONDUIT	LF	4160	0	0	4160			
107	L-108-5.2	NO. 6 AWG, SOLID, BARE COUNTERPOISE WIRE, INSTALLED IN TRENCH, ABOVE THE DUCT BANK OR CONDUIT, INCLUDING CONNECTIONS/TERMINATIONS, GROUND RODS AND GROUND CONNECTORS	LF	3330	0	0	3330			
108	L-110-5.1	NON-ENCASED ELECTRICAL CONDUIT, 1-WAY 2-INCH, PVC SCHEDULE 40	LF	2955	0	0	2955			
109	L-110-5.2	CONCRETE ENCASED ELECTRICAL CONDUIT, 2-WAY 2-INCH, PVC SCHEDULE 40	LF	375	0	0	375			
110	L-115-5.2	L-867B BASE CAN WITH BLANK COVER USED AS A SPLICE CAN	EA	5	0	0	5			
111	L-125-5.1	REMOVAL OF EXISTING TAXIWAY EDGE LIGHT FIXTURES AND SIGNS, INCLUDING BASE CAN, ISOLATION TRANSFORMER, SIGN FOUNDATION, CONDUIT, DUCTBANK, AND WIRE	LS	1	0	0	1			
112	L-125-5.2	L-861(L) MEDIUM INTENSITY TAXIWAY EDGE LIGHT (WITHOUT ARCTIC KIT), BLUE LENS INSTALLED ON NEW L-867-B GALVANIZED BASE CAN (INCLUDES FIXTURE, TRANSFORMER, AND BASE CAN)	EA	39	0	0	39			
113	L-125-5.3	L-858(L) GUIDANCE SIGN, SIZE 2, INCLUDING FOUNDATION, ISOLATION TRANSFORMER, WIRE, BASE CAN, AND CONDUIT	EA	10	0	0	10			
114	P-101	SAWING BITUMINOUS PAVEMENT (FULL DEPTH)	LF	970	0	0	970			
115	P-101	REMOVE BITUMINOUS PAVEMENT (FULL DEPTH)	SY	13300	0	0	13300			
116	P-101	MILL BITUMINOUS PAVEMENT (DEPTH VARIES)	SY	170	0	0	170			
117	P-101	SAWING CONCRETE PAVEMENT (FULL DEPTH)	LF	550	0	0	550			
118	P-101	REMOVE CONCRETE PAVEMENT (FULL DEPTH)	SY	860	0	0	860			
119	P-101	REMOVE STORM PIPE	LF	2170	0	0	2170			
120	P-101	REMOVE STORM STRUCTURE	EA	17	0	0	17			
121	P-101	REMOVE DRAIN TILE CLEANOUT	EA	1	0	0	1			
122	P-101	REMOVE DRAIN TILE	LF	160	0	0	160			
123	P-152	COMMON EXCAVATION (EV)	CY	19500	0	1300	20800			
124	P-152	UNCLASSIFIED OVER EXCAVATION (EV) (INCLUDES REMOVAL AND REPLACEMENT OF UNSUITABLE MATERIAL WITH SUITABLE MATERIAL (P-154) AS DIRECTED BY ENGINEER, AND ALSO INCLUDES SUBGRADE PROOF ROLLING)	CY	500	0	0	500			
125	P-152	MUCK EXCAVATION (EV)	CY	150	0	0	150			
126	P-152	SUBGRADE PREPARATION (INCLUDES SUBGRADE PROOF ROLLING)	SY	12460	0	1240	13700			
127	P-152	ROCK EXCAVATION	CY	50	0	0	50			

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STATEMENT OF ESTIMATED QUANTITIES

LINE NO.	ITEM NO.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY			FINAL QUANTITY			
				AIP ELIGIBLE FUNDING	AIP INELIGIBLE FUNDING		AIP ELIGIBLE FUNDING	AIP INELIGIBLE FUNDING		TOTAL
					ANG	DAA		ANG	DAA	
SCHEDULE B - TAXIWAY A RECONSTRUCTION, PHASE 3 (BID ALTERNATE)										
128	P-154	GRANULAR BORROW (CV)	CY	6070	0	720	6790			
129	P-154	GEOTEXTILE FABRIC, TYPE 7	SY	10280	0	1240	11520			
130	P-209	CRUSHED AGGREGATE BASE COURSE (CV)	CY	3210	0	420	3630			
131	P-401	BITUMINOUS SURFACE COURSE	TON	710	0	150	860			
132	P-401	BITUMINOUS BASE COURSE	TON	1420	0	290	1710			
133	P-403	BITUMINOUS SURFACE COURSE	TON	620	0	0	620			
134	P-403	BITUMINOUS BASE COURSE	TON	620	0	0	620			
135	P-603	BITUMINOUS TACK COAT	GAL	890	0	130	1020			
136	P-606	JOINT SEALING FILLER	LF	260	0	0	260			
137	P-620	RUNWAY & TAXIWAY PAVEMENT MARKING	SF	11605	0	0	11605			
138	P-620	TEMPORARY PAVEMENT MARKING (INCL. REFLECTIVE BEADS)	SF	308	0	0	308			
139	P-620	REFLECTIVE MEDIA	LB	710	0	0	710			
140	T-901	SEEDING (INCLUDING FERTILIZER)	ACRE	7.50	0.00	0.00	7.50			
141	T-905	SELECT TOPSOIL BORROW (IMPORT) (CV)	CY	200	0	0	200			
142	T-908	HYDROMULCHING	ACRE	7.50	0.00	0.00	7.50			

SEQ NOTES - SCHEDULE B

- GENERAL: TEMPORARY SANITARY FACILITIES, WATER FOR DUST CONTROL, AND TEMPORARY WATER SUPPLY FOR CONSTRUCTION OPERATIONS ARE CONSIDERED INCIDENTAL TO OTHER ITEMS OF PROJECT WORK.
- GENERAL: ANY FAA, AIRPORT, PRIVATE UTILITY, OR 148TH FW CABLES THAT ARE SCHEDULED TO REMAIN SHALL BE LOCATED VIA HYDRO-EXCAVATION PRIOR TO EXCAVATING OPERATIONS. ALL UTILITIES REQUESTED TO BE LOCATED BY FAA SHALL BE HYDRO-EXCAVATED. ANTICIPATE 8-HOURS OF HYDROEXCAVATION EFFORT, INCIDENTAL TO THE EXCAVATION AND LOCATING WORK.
- ITEM 82: RESTORATION INCLUDES GRADING, TURF ESTABLISHMENT, AND ANY OTHER MEASURES REQUIRED TO RETURN THE AREA TO PRE-CONSTRUCTION CONDITIONS OR BETTER, AS APPROVED BY ENGINEER.
- ITEM 83: INCLUDES ALL TRAFFIC CONTROL SIGNAGE, BARRICADES, TEMPORARY FENCING, TRAFFIC CONTROL DEVICES, AND ALL ITEMS PERTAINING TO SECURITY, AND PHASING.
- ITEM 94: MOBILIZATION SHALL BE LIMITED TO 10-PERCENT OF THE TOTAL PROJECT COST. FURNISHING, INSTALLING, AND REMOVAL OF ELECTRICAL JUMPERS REQUIRED FOR TEMPORARY ELECTRICAL CONSTRUCTION IS CONSIDERED INCIDENTAL TO THE WORK OF MOBILIZATION.
- ITEM 95-98: CONNECTIONS TO EXISTING STORM DRAIN PIPE, STRUCTURE, DRAIN TILE, INSPECTION PIT, AND CLEANOUT ARE ALL INCIDENTAL TO THESE PAY ITEMS.
- ITEM 99-100: CONNECTIONS TO EXISTING STORM DRAIN PIPE, STRUCTURE, DRAIN TILE, INSPECTION PIT, AND CLEANOUT ARE ALL INCIDENTAL TO THESE PAY ITEMS. ALL ITEMS REQUIRED FOR DRAIN TILE (TRENCHING, FILTER MATERIAL, FABRIC, CONNECTIONS, BACKFILLING, AND ASSOCIATED COMPACTION) ARE INCIDENTAL TO ITEM.
- ITEM 101-104: CONNECTIONS TO EXISTING STORM DRAIN PIPE, STRUCTURE, DRAIN TILE, INSPECTION PIT, AND CLEANOUT ARE ALL INCIDENTAL TO THESE PAY ITEMS.
- ITEM 105: WORK INCLUDES ADJUSTMENT OF EXISTING STORM STRUCTURE TO FINISHED GRADE, INCLUDING ANY REQUIRED MODIFICATIONS TO EXISTING STRUCTURE AND INSTALLATION OF NEW CASTING.
- ITEM 115: WORK INCLUDES REMOVAL OF BITUMINOUS PAVEMENT AND ANY UNDERLYING CONCRETE PAVEMENT LAYERS, REGARDLESS OF ACTUAL PAVEMENT THICKNESS ENCOUNTERED. APPENDIX A GEOTECHNICAL REPORT REFLECTS EXISTING COMPOSITE PAVEMENT SECTIONS WERE OBSERVED IN SOIL BORINGS AND PAVEMENT CORES FOR PAVEMENTS SOUTH OF TAXIWAY A.
- ITEM 119: REQUIRED PIPE/STRUCTURE BULKHEADS ARE INCIDENTAL TO PIPE REMOVAL. STORM SEWER PIPE TO BE REMOVED RANGES IN SIZE BETWEEN 8" AND 30" DIAMETER PIPE. APPROXIMATELY 400 LF OF STORM SEWER TO BE REMOVED IS 30" IN DIAMETER.
- ITEM 123: SEE EARTHWORK SUMMARY ON SHEET G6.01.
- ITEM 124: SEE EARTHWORK SUMMARY ON SHEET G6.01. ITEM INCLUDES MATERIAL EXCAVATED BELOW THE TYPICAL SECTION, AS DIRECTED BY ENGINEER. EXCAVATED MATERIAL TO BECOME PROPERTY OF CONTRACTOR, REPLACEMENT OF EXCAVATED MATERIAL WITH SUITABLE GRANULAR MATERIAL WILL BE INCIDENTAL TO THE UNCLASSIFIED OVER EXCAVATION.
- ITEM 125: SEE EARTHWORK SUMMARY ON SHEET G6.01.
- ITEM 127: SEE EARTHWORK SUMMARY ON SHEET G6.01.
- ITEM 141: ALL ON-SITE STRIPPING, SALVAGING, STOCKPILING, REPLACING AND SPREADING QUANTITY WILL BE PAID FOR UNDER COMMON EXCAVATION PRIOR TO THE PLACEMENT OF TOPSOIL BORROW (OBTAINED OFF-SITE) BY CONTRACTOR.
- ITEMS 106-113: NO PRICE ADJUSTMENT WILL BE MADE BASED ON PERCENTAGE OF QUANTITY USED. THE ENGINEER WILL PROVIDE A NOTICE TO PROCEED SPECIFICALLY FOR WIRE & CABLE ITEMS PRIOR TO ORDERING TO ENSURE THE CORRECT AMOUNT IS OBTAINED.



I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR CONTRACT DOCUMENTS WERE PREPARED BY ME OR UNDER MY SUPERVISION AND THAT I AM A LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

James R. Nelson
 James R. Nelson, P.E.
 JRN0017, Nelson, P.E.
 DATE: JUNE 13, 2023 LICENSE NO. 28284

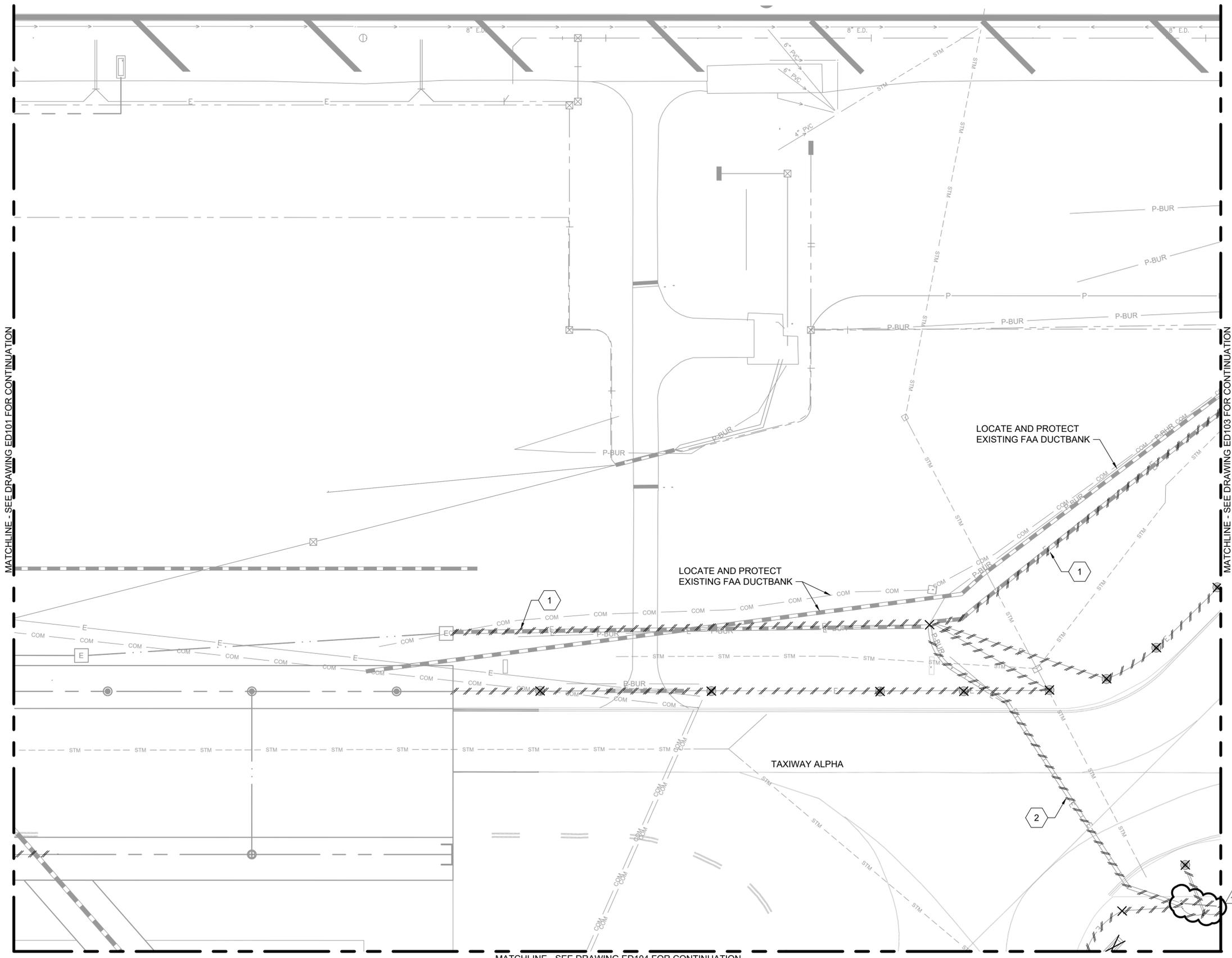
DULUTH INTERNATIONAL AIRPORT (DLH)
TAXIWAY A RECONSTRUCTION - PHASE 3
 DULUTH, MINNESOTA

7-6-2023 ADDENDUM 2
 7-3-2023 ADDENDUM 1
 MARK DATE DESCRIPTION REVISIONS

DLH\11688045
 STATE PROJECT NO. A8001-205
 ISSUE DATE: JUNE 13, 2023 JN AA
 DESIGNED BY
 DRAWN BY
 Short Elliott Hendrickson, Inc. © (SEH)
 © 2023 Short Elliott Hendrickson, Inc.

SHEET TITLE
STATEMENT OF ESTIMATED QUANTITIES - SCHEDULE B

\\bncc\dfs\Clients\ANP\Duluth\NID\H147964_TWA-Phase3\Design\Elec\Sheets\147964ED101.dwg 7/5/2023 3:34 PM dbruemmer

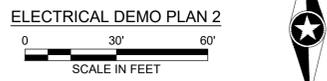
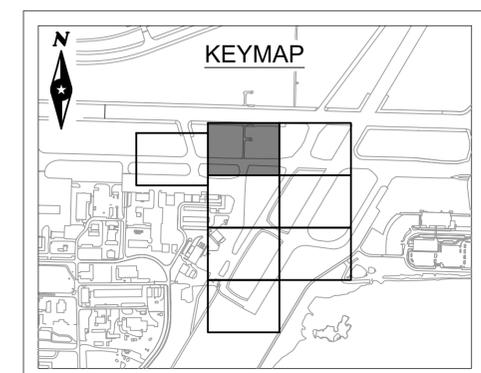


NOTES:
 1. SEE SHEETS E-001 AND E-002 FOR DEMOLITION NOTES.

KEYED NOTES:

1. EXISTING DUCTBANK MUST REMAIN OPERATIONAL DURING DURATION OF PROJECT UNTIL CUTOVER PHASE. EXISTING CONCRETE ENCASED DUCTBANK TO BE REMOVED UPON COMPLETION OF CIRCUIT CUTOVER. SEE G2 SERIES SHEETS FOR PHASING.

2. PROVIDE JUMPERS FOR EXISTING CIRCUITS UPON DEMOLITION OF EXISTING DUCTBANK. SEE GENERAL NOTE 13 ON SHEET E-001.



BURNS MEDONNELL
PROJECT 147964 - MAIN OPERATOR 616-333-9400

DULUTH INTERNATIONAL AIRPORT
DULUTH INTERNATIONAL AIRPORT

I HEREBY CERTIFY THAT THIS PLAN SPECIFICATION, OR ANY PART THEREOF, WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SHAWN M. WHALEN
 DATE: JUN 13, 2023 LICENSE NO. 23984

**DULUTH INTERNATIONAL AIRPORT (DLH)
 TAXIWAY A
 RECONSTRUCTION - PHASE 3
 DULUTH, MINNESOTA**

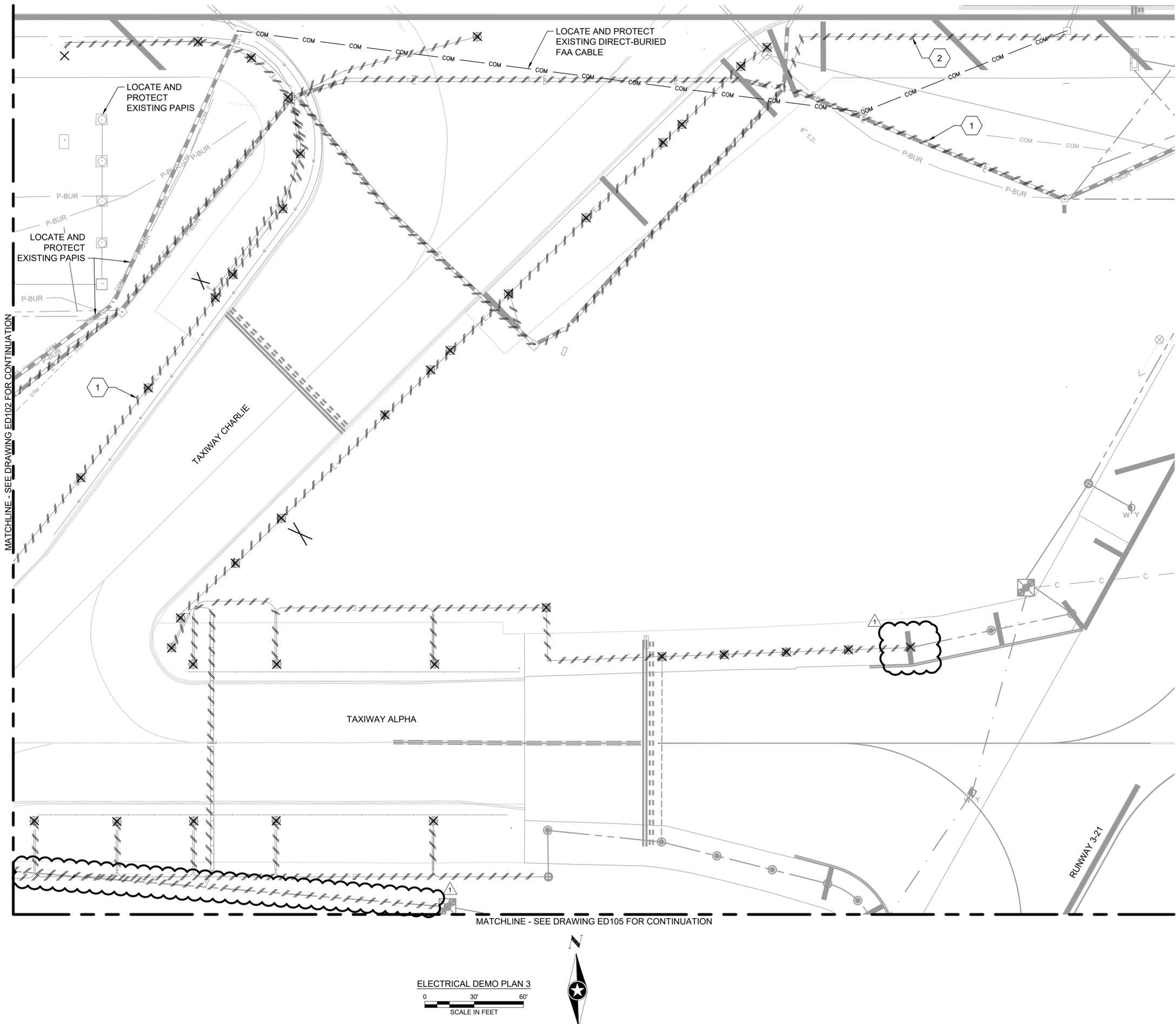
MARK	DATE	NO.	DESCRIPTION
1	7-6-2023	NO. 2	APPENDUM REVISIONS

<small>SEH FILE NO.</small> DULAI_168804	<small>STATE PROJECT NO.</small> JUN 13, 2023	<small>ISSUE DATE</small> DSB	<small>DESIGNED BY</small> MNB
<small>DRAWN BY</small>			

SHEET TITLE
**ELECTRICAL DEMO
 PLAN 2**

SHEET
ED102

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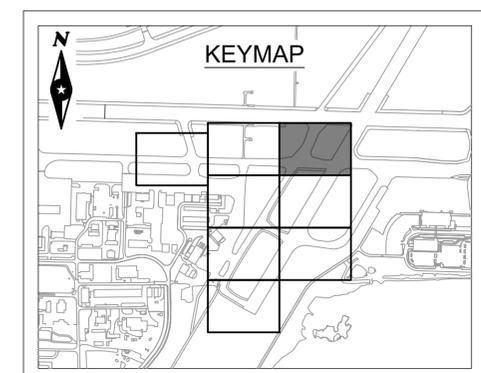


NOTES:
 1. SEE SHEETS E-001 AND E-002 FOR DEMOLITION NOTES.

KEYED NOTES:

1. EXISTING DUCTBANK MUST REMAIN OPERATIONAL DURING DURATION OF PROJECT UNTIL CUTOVER PHASE. EXISTING CONCRETE ENCASED DUCTBANK TO BE REMOVED UPON COMPLETION OF CIRCUIT CUTOVER. SEE G2 SERIES SHEETS FOR PHASING.

2. PROVIDE JUMPERS FOR EXISTING CIRCUITS UPON DEMOLITION OF EXISTING DUCTBANK. SEE GENERAL NOTE 13 ON SHEET E-001.



BURNS MEDONNELL
PROJECT 147964 - MAIN OPERATOR 616-333-9400

DULUTH INTERNATIONAL AIRPORT

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR CONTRACT DOCUMENTS WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SHAWN M. WHALEN
DATE: JUN 13, 2023 LICENSE NO. 23984

**DULUTH INTERNATIONAL AIRPORT (DLH)
TAXIWAY A
RECONSTRUCTION - PHASE 3
DULUTH, MINNESOTA**

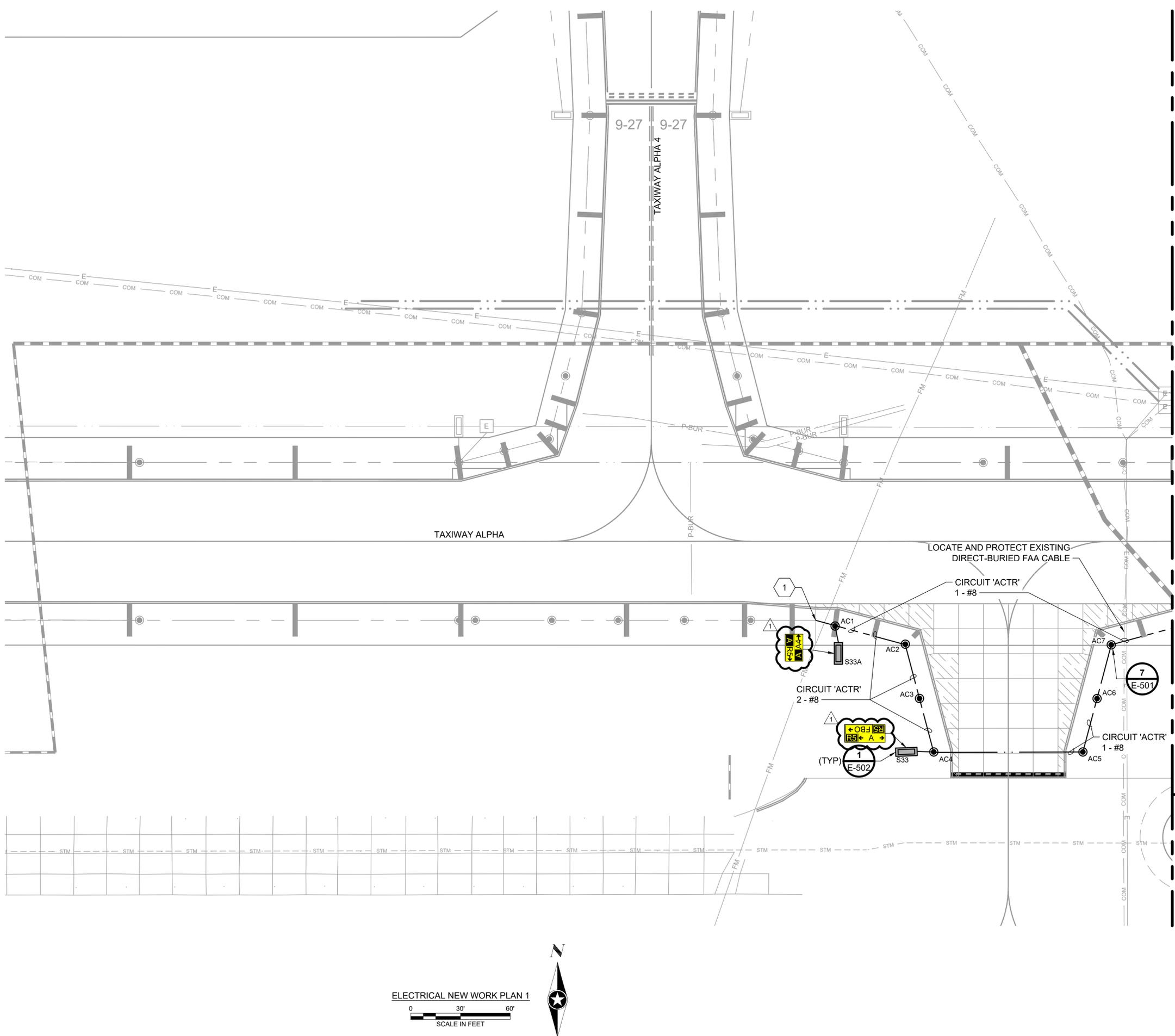
MARK	DATE	DESCRIPTION
1	7-6-2023	APPENDUM NO. 2

SEH FILE NO. DULAI_168804	ISSUE DATE JUN 13, 2023	DESIGNED BY DSB	DRAWN BY MNB
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SHEET TITLE
ELECTRICAL DEMO
PLAN 3

SHEET
ED103

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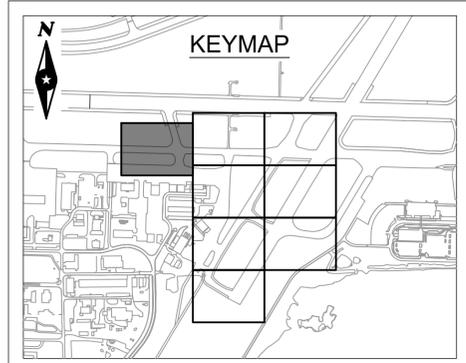
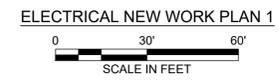


- NOTES:**
- SEE SHEETS E-001 AND E-002 FOR LEGEND, ABBREVIATIONS, INFORMATION ON CIRCUITS, AND GENERAL NOTES.
 - SEE SIGN SCHEDULE ON SHEET E-111 FOR SIGN CONFIGURATION.
 - ALL EXISTING UTILITIES ARE NOT SHOWN ON THE PLANS. CONTRACTOR SHALL VERIFY LOCATIONS AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION.
 - COVER OR DISCONNECT ALL TAXIWAY LIGHTS AND GUIDANCE SIGNS WITHIN THE CLOSURE AREA.
 - NEW BASE CAN AND SIGN LOCATIONS SHALL BE STAKED OUT BY A REGISTERED SURVEYOR..
 - CONTRACTOR SHALL REPLACE, AT NO ADDITIONAL COST, ANY LIGHT FIXTURE, BASE CAN, ISOLATION TRANSFORMER, OR CABLE DAMAGED BY THE CONTRACTOR.
 - ALL CONDUITS SHALL BE INSTALLED TO ENSURE THAT WATER MAY DRAIN FROM ANY GIVEN BASE CAN. CONTRACTOR SHALL COORDINATE IN THE FIELD AND DOCUMENT ON AS-BUILT REDLINE DRAWINGS WHICH WAY CONDUITS DRAIN.
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- KEYED NOTES:**
- SPlice INTO EXISTING LIGHT CIRCUIT 'ACTR'.

MATCHLINE - SEE DRAWING E-102 FOR CONTINUATION

MATCHLINE - SEE DRAWING E-104 FOR CONTINUATION



BURNS MEDONNELL
PROJECT 147964 - MAIN OPERATOR 616-333-9400

DULUTH INTERNATIONAL AIRPORT

**DULUTH INTERNATIONAL AIRPORT (DLH)
TAXIWAY A
RECONSTRUCTION - PHASE 3
DULUTH, MINNESOTA**

DATE: JUN 13, 2023
LICENSE NO.: 23984

SHAWN M. WHALEN
PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

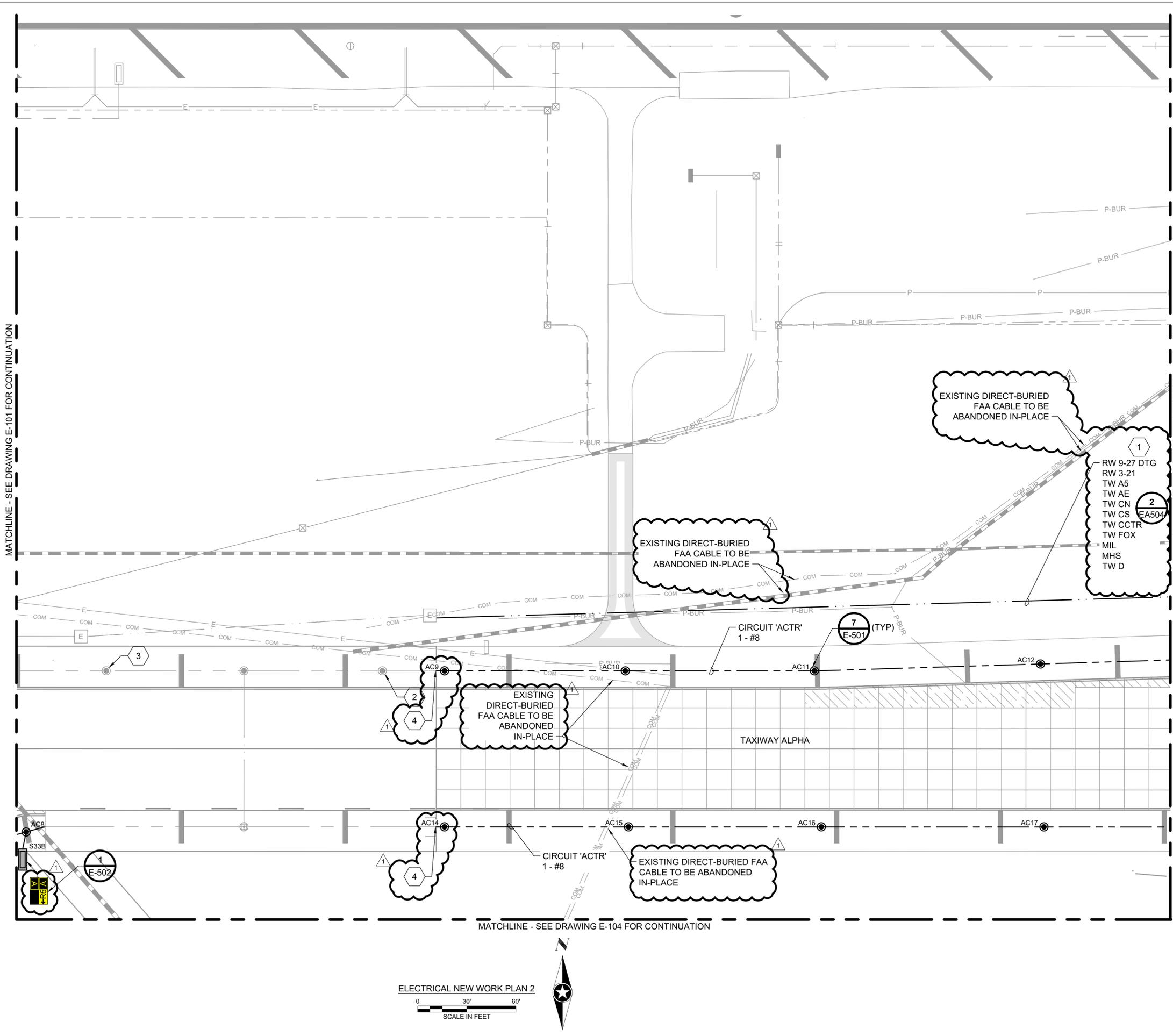
MARK	DATE	DESCRIPTION
1	7-6-2023	ADDENDUM NO. 2 REVISIONS

DULAI_188804
STATE PROJECT NO. JUN 13, 2023
ISSUE DATE DSB
DESIGNED BY MNB
DRAWN BY X X

**SHEET TITLE
ELECTRICAL NEW
WORK PLAN 1**

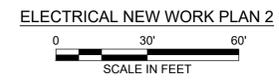
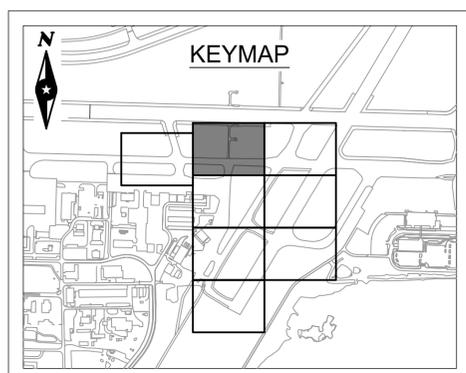
SHEET
E-101

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- NOTES:**
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- KEYED NOTES:**
- PROVIDE 2-#8 AWG L-824 5KV CABLING FOR EACH HOMERUN CIRCUIT LISTED.
 - RELOCATE EXISTING L-861T(L) LIGHT FIXTURE AND ISOLATION TRANSFORMER TO EXISTING BASE CAN "A122" ON THIS SHEET AND SPLICE INTO EXISTING 'TW ACTR' CIRCUIT. PROVIDE BASE PLATE ON EXISTING BASE CAN.
 - REMOVE EXISTING L-861T(L) LIGHT FIXTURE AND RETURN TO OWNER. PROVIDE BASE PLATE ON EXISTING BASE CAN.
 - ROUTE THROUGH EXISTING CONDUIT AND SPLICE INTO EXISTING CIRCUIT 'TW ACTR' IN NEAREST BASE CAN.



BURNS MEDONNELL
PROJECT 147964 - MAIN OPERATOR 616-333-9400

DULUTH INTERNATIONAL AIRPORT

DULUTH INTERNATIONAL AIRPORT RECONSTRUCTION - PHASE 3
DULUTH, MINNESOTA

I HEREBY CERTIFY THAT THIS PLAN SPECIFICATION OR CALCULATION WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
SHAWN M. WHALEN
DATE JUN 13, 2023 LICENSE NO. 23984

DULUTH INTERNATIONAL AIRPORT (DLH)
TAXIWAY A RECONSTRUCTION - PHASE 3
DULUTH, MINNESOTA

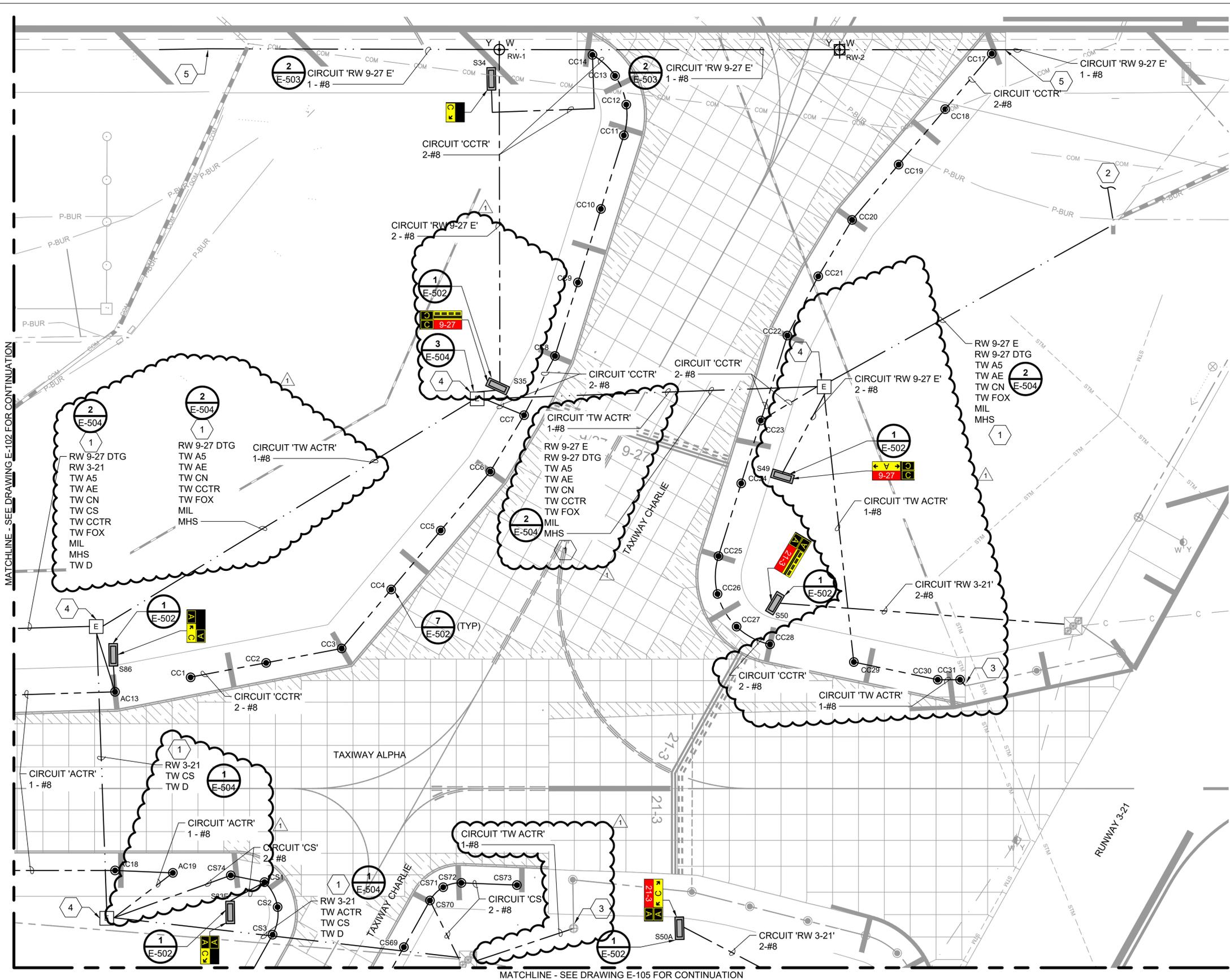
MARK	DATE	DESCRIPTION	APPENDIX NO.
1	7-6-2023	REVISIONS	

DULAI_168804
STATE PROJECT NO. JUN 13, 2023
ISSUE DATE DSB
DESIGNED BY MNB
DRAWN BY X X

SHEET TITLE
ELECTRICAL NEW WORK PLAN 2

SHEET
E-102

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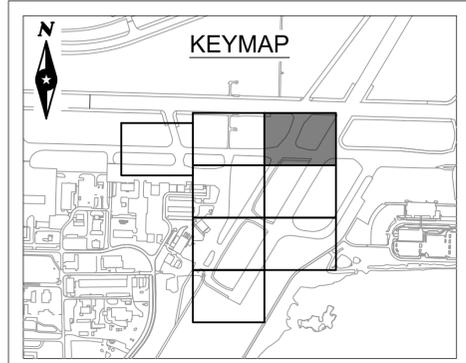


ELECTRICAL NEW WORK PLAN 3
 0 30' 60'
 SCALE IN FEET



- NOTES:**
- SEE SHEETS E-001 AND E-002 FOR LEGEND, ABBREVIATIONS, INFORMATION ON CIRCUITS, AND GENERAL NOTES.
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- KEYED NOTES:**
- PROVIDE 2-#8 AWG L-824 5KV CABLING FOR EACH CIRCUIT LISTED.
 - PROVIDE APPROXIMATELY 350 LF DIRECTIONAL BORE UNDER RW 9-27 FOR CIRCUIT "CHARLIE-NORTH".
 - PULL L-824C 5KV CABLING THROUGH EXISTING CONDUIT BACK TO NEAREST TAXIWAY EDGE LIGHT FIXTURE. SPLICE INTO EXISTING CIRCUIT 'TW ACTR'.
 - PROVIDE 2" PVC DRAIN CONDUIT TO NEAREST DRAIN STRUCTURE. COORDINATE LOCATION OF DRAINAGE WITH CIVIL DRAWINGS.
 - PULL L-824C 5KV CABLING THROUGH EXISTING CONDUIT BACK TO NEAREST RUNWAY EDGE LIGHT FIXTURE. SPLICE INTO EXISTING CIRCUIT 'RW 9-27'.



BURNS MEDONNELL
 PROJECT 147964 - MAIN OPERATOR 616-333-9400

DULUTH INTERNATIONAL AIRPORT

HEREBY CERTIFY THAT THIS PLAN SPECIFICATION OR CALCULATION WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SHAWN M. WHALEN
 DATE: JUN 13, 2023 LICENSE NO.: 23984

DULUTH INTERNATIONAL AIRPORT (DLH)

TAXIWAY A

RECONSTRUCTION - PHASE 3

DULUTH, MINNESOTA

MARK	DATE	NO.	REVISIONS	
			DESCRIPTION	BY
1	7-6-2023	1	ADDENDUM	

SEH FILE NO. DULAI_168904

STATE PROJECT NO. JUN 13, 2023

ISSUE DATE DSB

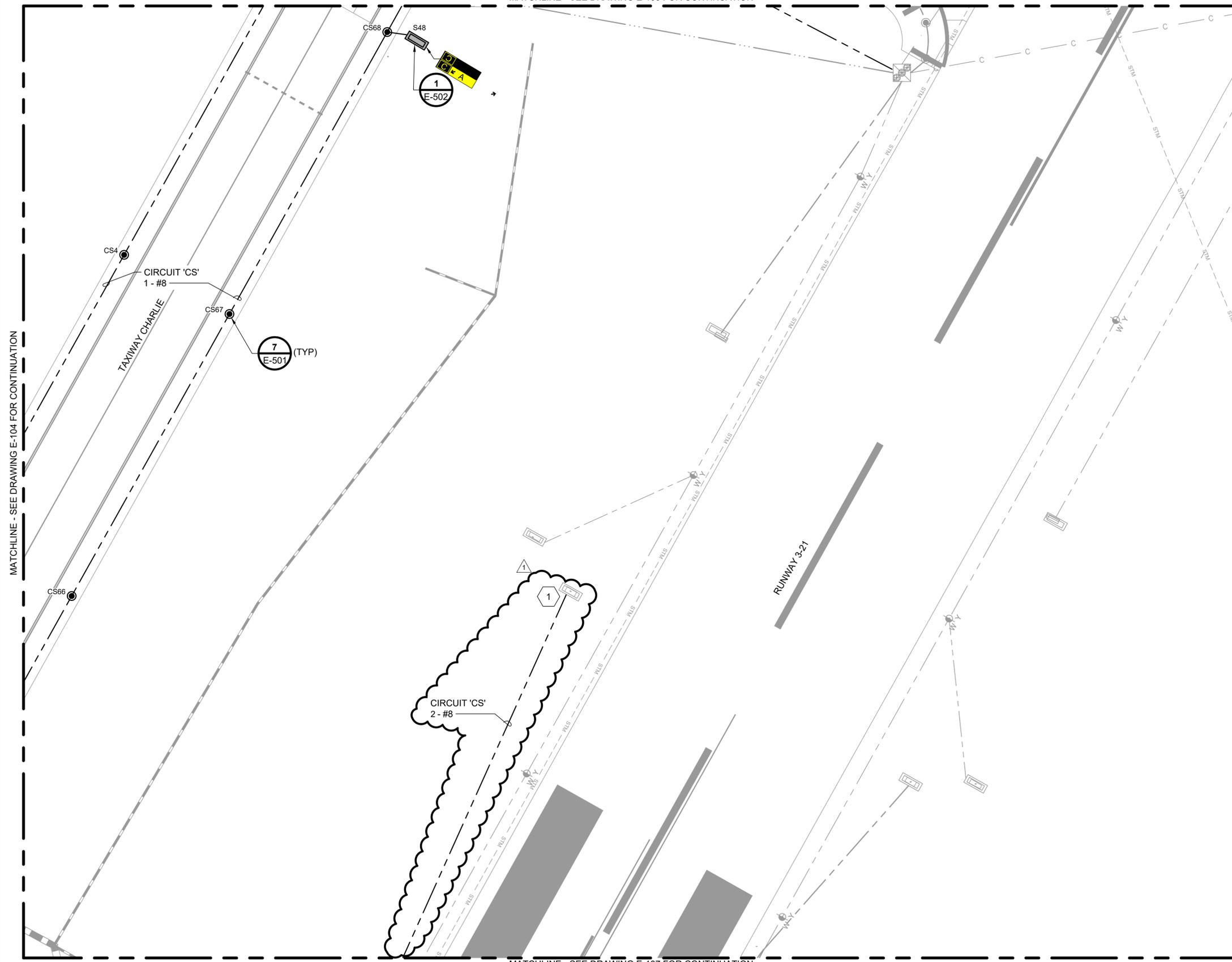
DESIGNED BY MNB

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SHEET TITLE
ELECTRICAL NEW WORK PLAN 3

SHEET
E-103

MATCHLINE - SEE DRAWING E-103 FOR CONTINUATION

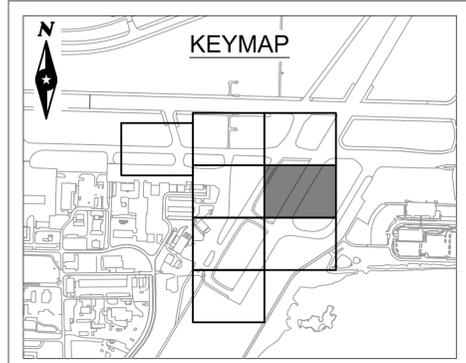
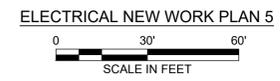


MATCHLINE - SEE DRAWING E-107 FOR CONTINUATION

NOTES:

- SEE SHEETS E-001 AND E-002 FOR LEGEND, ABBREVIATIONS, INFORMATION ON CIRCUITS, AND GENERAL NOTES.
- SEE SIGN SCHEDULE ON SHEET E-111 FOR SIGN CONFIGURATION.
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KEYED NOTES:
 1 CONNECT EXISTING SIGN FIXTURE "S47" TO TAXIWAY 'CC' CIRCUIT.



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BURNS & McDONNELL
PROJECT 147964 - MAIN OPERATOR 616-333-9400

DULUTH INTERNATIONAL AIRPORT

I HEREBY CERTIFY THAT THIS PLAN SPECIFICATION, OR ANY PART THEREOF, WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULUTH LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SHAWN M. WHALEN
DATE: JUN 13, 2023 LICENSE NO.: 23984

**DULUTH INTERNATIONAL AIRPORT (DLH)
TAXIWAY A
RECONSTRUCTION - PHASE 3
DULUTH, MINNESOTA**

MARK	DATE	DESCRIPTION
1	7-6-2023	NO. 2 REVISIONS

SEH FILE NO. DULAI_168804

STATE PROJECT NO. JUN 13, 2023

ISSUE DATE DSB

DESIGNED BY MNB

DRAWN BY

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SHEET TITLE
ELECTRICAL NEW WORK PLAN 5

SHEET
E-105

MATCHLINE - SEE DRAWING E-104 FOR CONTINUATION



MATCHLINE - SEE DRAWING E-108 FOR CONTINUATION

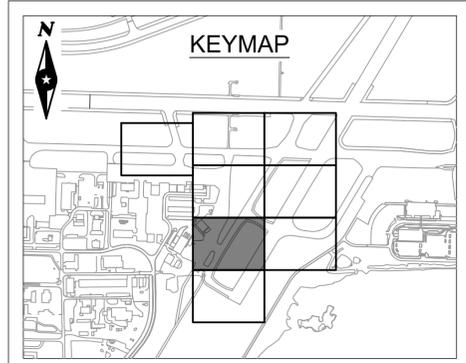
ELECTRICAL NEW WORK PLAN 6
 0 30' 60'
 SCALE IN FEET

NOTES:

- SEE SHEETS E-001 AND E-002 FOR LEGEND, ABBREVIATIONS, INFORMATION ON CIRCUITS, AND GENERAL NOTES.
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KEYED NOTES:

- IF BID ALTERNATE IS NOT AWARDED, SPLICE INTO EXISTING TAXIWAY 'CS' CIRCUIT.
- CONTRACTOR SHALL FIELD LOCATE EXISTING PAPI CIRCUITRY THROUGHOUT DURATION OF CONSTRUCTION LIMITS AND PROTECT IN PLACE.
- CONNECT EXISTING SIGN FIXTURE "S42" TO TAXIWAY 'CS' CIRCUIT.



BURNS MEDONNELL
 PROJECT 147964 - MAIN OPERATOR 616-333-9400

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SHAWN M. WHALEN
 DATE JUN 13, 2023 LICENSE NO. 23994

DULUTH INTERNATIONAL AIRPORT (DLH)
TAXIWAY A
RECONSTRUCTION - PHASE 3
 DULUTH, MINNESOTA

MARK	DATE	DESCRIPTION	APPENDIX NO.
1	7-6-2023	REVISIONS	

SEH FILE NO. DULAL_168804
 STATE PROJECT NO. JUN 13, 2023
 ISSUE DATE DSB
 DESIGNED BY MNB
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SHEET TITLE
 ELECTRICAL NEW WORK PLAN 6

SHEET
E-106

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MATCHLINE - SEE DRAWING E-105 FOR CONTINUATION



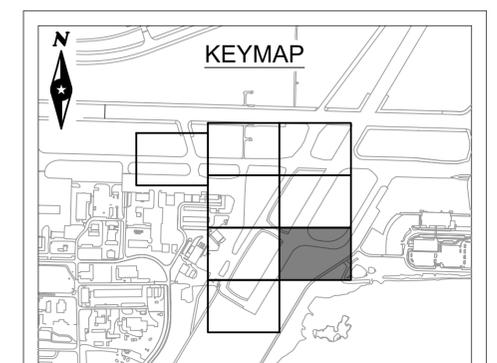
MATCHLINE - SEE DRAWING E-106 FOR CONTINUATION

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KEYED NOTES:

- 1 SPLICE INTO EXISTING RUNWAY EDGE LIGHT FIXTURE.
- 2 CONTRACTOR SHALL FIELD LOCATE EXISTING PAPI CIRCUITRY THROUGHOUT DURATION OF CONSTRUCTION LIMITS AND PROTECT IN PLACE.



PROJECT 147964 - MAIN OPERATOR 616-333-9400

DULUTH INTERNATIONAL AIRPORT

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR CONTRACT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SHAWN M. WHALEN
DATE: JUN 13, 2023 LICENSE NO.: 23984

DULUTH INTERNATIONAL AIRPORT (DLH)
TAXIWAY A
RECONSTRUCTION - PHASE 3
DULUTH, MINNESOTA

APPENDIX NO. 2
7-6-2023

REVISIONS

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STATE PROJECT NO. JUN 13, 2023
ISSUE DATE DSB
DESIGNED BY MNB
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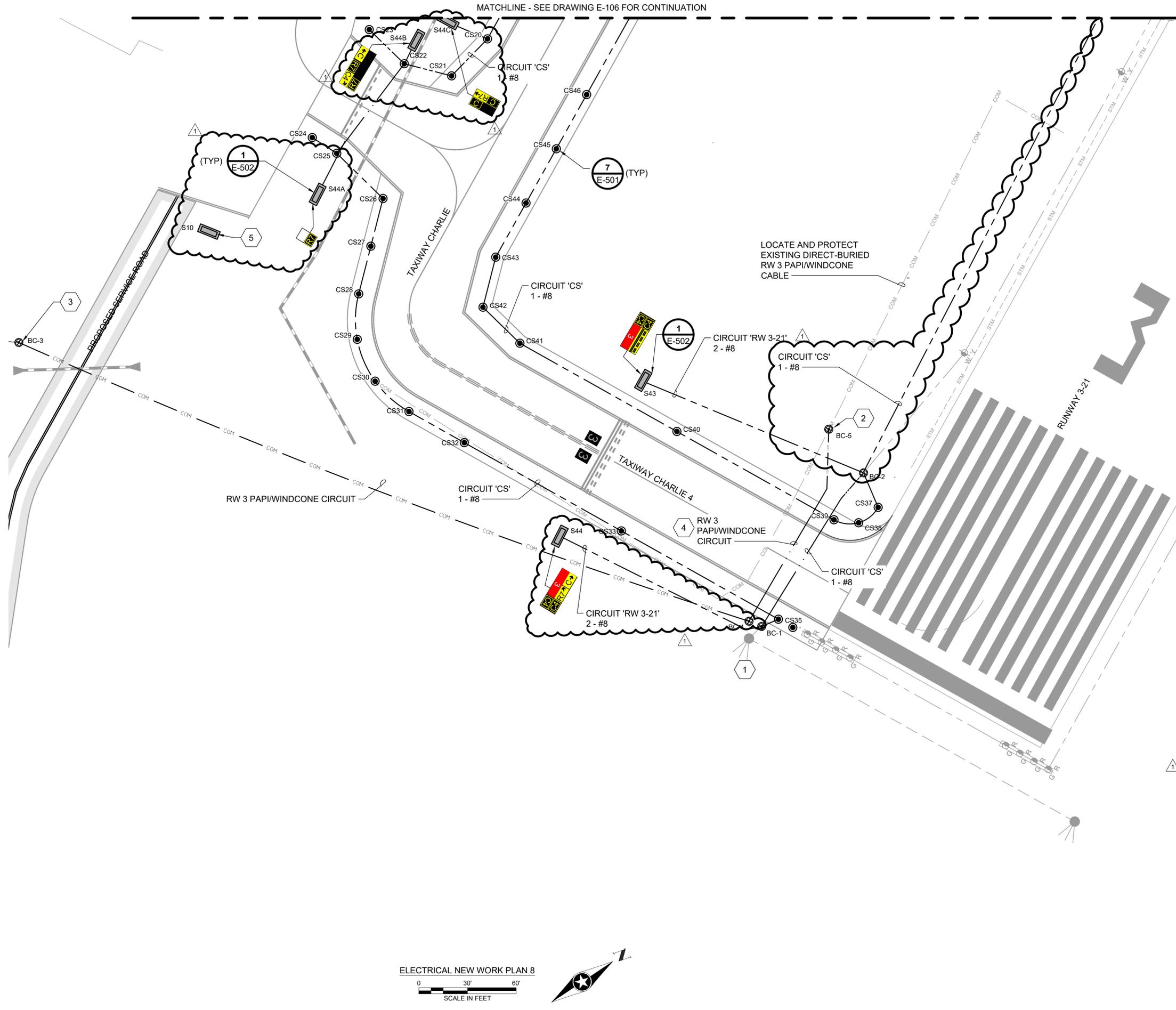
SHEET TITLE
ELECTRICAL NEW WORK PLAN 7

SHEET
E-107

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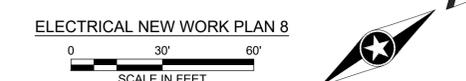
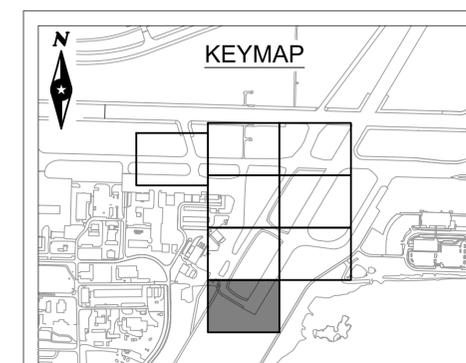
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MATCHLINE - SEE DRAWING E-106 FOR CONTINUATION



- NOTES:**
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 - ALL NEW LIGHTING FIXTURE DRAIN CONDUITS SHALL BE INCIDENTAL TO FIXTURE INSTALLATION. STRUCTURE DRAINS INDICATED SHALL BE COORDINATED WITH CIVIL DRAWINGS. WHERE SHOULDERS ARE NOT BEING REPAIRED, CONTRACTOR SHALL SAW CUT EXISTING PAVEMENT AND PATCH, WHICH SHALL BE INCIDENTAL TO DRAIN INSTALLATION.
 - CONTRACTOR MUST COORDINATE PHASING OF ALL WORK WITH PHASING PLANS (G0.10 THROUGH G0.16). COORDINATION MUST INCLUDE DAA, ATCT AND FAA REPRESENTATIVES AND MUST TAKE INTO ACCOUNT SYSTEM OUTAGES. ALL CUT-OVERS MUST BE COMPLETED WITHIN A WORK DAY AND LIGHTING CIRCUITS OPERATIONAL PRIOR TO DUSK AS COORDINATED WITH DAA. DUCTBANK CONSTRUCTION MUST BE PERFORMED EARLY IN A GIVEN PHASE WORK AREA SO THAT LIGHTING CIRCUITS CAN BE CUT-OVER PRIOR TO DEMOLITION OF EXISTING DUCTBANKS AND STRUCTURES. PROVIDE TEMPORARY JUMPERING BETWEEN STRUCTURES AS REQUIRED DURING DIFFERENT PROJECT PHASING STAGES.
 - ALL NEW WORK ON THIS SHEET SHALL BE PART OF BID ALTERNATE 1.

- KEYED NOTES:**
- CONTRACTOR SHALL FIELD LOCATE EXISTING PAPI AND REIL CIRCUITRY THROUGHOUT DURATION OF CONSTRUCTION LIMITS AND PROTECT IN PLACE. EXISTING CIRCUIT ROUTES TO EXISTING RW 3 PAPIs AND WINDCONE.
 - FIELD LOCATE EXISTING PAPI CONSTANT-VOLTAGE CIRCUIT AND UTILIZE SPLICE CAN TO INTERCEPT AND SPLICE INTO EXISTING CIRCUIT.
 - FIELD LOCATE EXISTING PAPI CONSTANT-VOLTAGE CIRCUIT AND UTILIZE SPLICE CAN TO INTERCEPT AND SPLICE INTO EXISTING CIRCUIT WEST OF PROPOSED SERVICE ROAD. COORDINATE SERVICE ROAD LOCATION WITH CIVIL DRAWINGS.
 - ENCASE CIRCUIT IN 2" CONCRETE-ENCASED CONDUIT UNDER PAVEMENT.
 - RELOCATE EXISTING SIGN "S10" ADJACENT TO PROPOSED SERVICE ROAD.



BURNS MEDONNELL
PROJECT 147964 - MAIN OPERATOR 616-333-9400

DULUTH INTERNATIONAL AIRPORT

DATE: JUN 13, 2023 LICENSE NO: 23984

SHAWN M. WHALEN

I HEREBY CERTIFY THAT THIS PLAN SPECIFICATION, OR SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DULUTH INTERNATIONAL AIRPORT (DLH) TAXIWAY A RECONSTRUCTION - PHASE 3 DULUTH, MINNESOTA

MARK	DATE	DESCRIPTION	APPENDIX NO.	REVISIONS
1	7-6-2023	DSB	MNB	

SEH FILE NO. DULAL_168804
STATE PROJECT NO. JUN 13, 2023
ISSUE DATE DSB
DESIGNED BY MNB
DRAWN BY

SHEET TITLE
ELECTRICAL NEW WORK PLAN 8

SHEET
E-108

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TAXIWAY LIGHT FIXTURE LOCATIONS			
LIGHT FIXTURE	NORTHING	EASTING	CIRCUIT
CS1	14117.11	47160.41	TW CS
CS2	14115.89	47161.00	TW CS
CS3	14114.56	47160.71	TW CS
CS4	14101.25	47152.60	TW CS
CS5	14087.94	47144.49	TW CS
CS6	14074.63	47136.38	TW CS
CS7	14071.13	47134.24	TW CS
CS8	14067.63	47132.11	TW CS
CS9	14064.13	47130.04	TW CS
CS10	14060.40	47127.70	TW CS
CS11	14058.57	47125.79	TW CS
CS12	14059.26	47123.45	TW CS
CS13	14060.60	47122.00	TW CS
CS14	14062.20	47121.74	TW CS
CS15	14054.95	47117.91	TW CS
CS16	14054.24	47120.32	TW CS
CS17	14052.43	47122.05	TW CS
CS18	14049.90	47121.30	TW CS
CS19	14035.99	47112.83	TW CS
CS20	14022.08	47104.35	TW CS
CS21	14020.25	47102.44	TW CS
CS22	14020.96	47100.04	TW CS
CS23	14022.78	47098.30	TW CS
CS24	14017.36	47095.18	TW CS
CS25	14016.51	47096.41	TW CS

TAXIWAY LIGHT FIXTURE LOCATIONS			
LIGHT FIXTURE	NORTHING	EASTING	CIRCUIT
CS26	14014.11	47098.70	TW CS
CS27	14011.69	47097.99	TW CS
CS28	14009.27	47097.27	TW CS
CS29	14006.95	47097.11	TW CS
CS30	14004.78	47097.95	TW CS
CS31	14003.16	47099.63	TW CS
CS32	14001.47	47102.41	TW CS
CS33	13996.66	47110.30	TW CS
CS35	13991.85	47118.20	TW CS
CS37	13997.39	47123.52	TW CS
CS38	13996.64	47122.49	TW CS
CS39	13996.83	47121.23	TW CS
CS40	14001.64	47113.34	TW CS
CS41	14006.45	47105.45	TW CS
CS42	14008.36	47103.62	TW CS
CS43	14010.90	47104.37	TW CS
CS44	14013.61	47106.02	TW CS
CS45	14016.33	47107.68	TW CS
CS46	14019.04	47109.33	TW CS
CS47	14032.95	47117.81	TW CS
CS48	14046.86	47126.28	TW CS
CS49	14050.36	47128.42	TW CS
CS50	14053.86	47130.55	TW CS
CS51	14057.37	47132.69	TW CS
CS52	14061.09	47134.96	TW CS

TAXIWAY LIGHT FIXTURE LOCATIONS			
LIGHT FIXTURE	NORTHING	EASTING	CIRCUIT
CS53	14062.92	47136.87	TW CS
CS54	14062.17	47139.40	TW CS
CS55	14057.37	47147.28	TW CS
CS56	14052.57	47155.16	TW CS
CS57	14051.54	47155.91	TW CS
CS58	14050.28	47155.71	TW CS
CS59	14058.11	47160.48	TW CS
CS60	14057.36	47159.45	TW CS
CS61	14057.55	47158.19	TW CS
CS62	14062.35	47150.31	TW CS
CS63	14067.15	47142.44	TW CS
CS64	14069.06	47140.61	TW CS
CS65	14071.60	47141.36	TW CS
CS66	14084.91	47149.47	TW CS
CS67	14098.22	47157.58	TW CS
CS68	14111.52	47165.69	TW CS
CS69	14113.73	47167.03	TW CS
CS70	14115.93	47168.38	TW CS
CS71	14116.55	47169.04	TW CS
CS72	14116.73	47169.92	TW CS
CS73	14116.53	47172.61	TW CS
CS74	14117.50	47158.79	TW CS

TAXIWAY LIGHT FIXTURE LOCATIONS			
LIGHT FIXTURE	NORTHING	EASTING	CIRCUIT
AC1	14120.58	47072.71	TW ACTR
AC2	14119.54	47076.21	TW ACTR
AC3	14116.80	47076.82	TW ACTR
AC4	14114.09	47077.44	TW ACTR
AC5	14113.82	47084.94	TW ACTR
AC6	14116.47	47085.75	TW ACTR
AC7	14119.14	47086.56	TW ACTR
AC8	14119.97	47090.13	TW ACTR
AC9	14127.37	47111.70	TW ACTR
AC10	14127.04	47120.89	TW ACTR
AC11	14126.69	47130.50	TW ACTR
AC12	14126.62	47142.01	TW ACTR
AC13	14126.55	47153.51	TW ACTR
AC14	14119.46	47111.41	TW ACTR
AC15	14119.12	47120.76	TW ACTR
AC16	14118.76	47130.57	TW ACTR
AC17	14118.35	47141.88	TW ACTR
AC18	14117.94	47153.20	TW ACTR
AC19	14117.72	47155.99	TW ACTR

SIGNAGE LOCATIONS			
LIGHT FIXTURE	NORTHING	EASTING	CIRCUIT
S44	13996.94	47107.42	RW 3-21
S44C	14022.75	47102.84	TW CS
S44B	14021.64	47100.44	TW CS
S44A	14014.88	47095.63	TW CS
S10	14012.97	47089.21	N/A
S41A	14050.38	47120.60	TW CS
S37	14060.03	47123.78	TW CS
S34	14156.01	47172.79	RW 9-27
S50A	14114.71	47180.40	RW 3-21
S48	14111.38	47166.66	TW CS
S38	14071.04	47142.03	TW CS
S39	14064.48	47148.56	RW 3-21
S40	14058.00	47144.60	RW 3-21
S41	14060.69	47135.67	TW CS
S43	14003.83	47111.44	RW 3-21
S50	14129.22	47185.28	RW 3-21
S49	14135.97	47185.63	RW 9-27
S35	14140.38	47173.03	RW 9-27
S86	14127.80	47153.48	TW ACTR
S33E	14116.28	47158.71	TW ACTR

TAXIWAY LIGHT FIXTURE LOCATIONS			
LIGHT FIXTURE	NORTHING	EASTING	CIRCUIT
CC1	14127.12	47157.19	TW CCTR
CC2	14127.68	47160.87	TW CCTR
CC3	14128.25	47164.55	TW CCTR
CC4	14131.01	47167.04	TW CCTR
CC5	14133.76	47169.54	TW CCTR
CC6	14136.52	47172.04	TW CCTR
CC7	14139.18	47173.78	TW CCTR
CC8	14141.98	47175.37	TW CCTR
CC9	14145.49	47176.61	TW CCTR
CC10	14149.00	47177.85	TW CCTR
CC11	14152.50	47179.09	TW CCTR
CC12	14153.98	47179.26	TW CCTR
CC13	14155.39	47178.77	TW CCTR
CC14	14156.44	47177.71	TW CCTR
CC17	14155.80	47197.02	TW CCTR

TAXIWAY LIGHT FIXTURE LOCATIONS			
LIGHT FIXTURE	NORTHING	EASTING	CIRCUIT
CC18	14153.21	47194.67	TW CCTR
CC19	14150.62	47192.32	TW CCTR
CC20	14148.02	47189.98	TW CCTR
CC21	14145.36	47188.24	TW CCTR
CC22	14142.56	47186.65	TW CCTR
CC23	14138.51	47185.21	TW CCTR
CC24	14135.51	47184.15	TW CCTR
CC25	14132.04	47182.93	TW CCTR
CC26	14130.22	47182.81	TW CCTR
CC27	14128.61	47183.68	TW CCTR
CC28	14127.70	47185.27	TW CCTR
CC29	14126.69	47189.29	TW CCTR
CC30	14125.69	47193.31	TW CCTR
CC31	14125.65	47194.39	TW CCTR

BASE CAN LOCATION			
LIGHT FIXTURE	NORTHING	EASTING	CIRCUIT
BC-1	13991.51	47117.32	N/A
BC-2	13999.18	47122.83	N/A
BC-3	14007.42	47079.75	N/A
BC-4	13991.80	47116.68	N/A
BC-5	14001.48	47121.13	N/A

RUNWAY EDGE LIGHT LOCATION			
LIGHT FIXTURE	NORTHING	EASTING	CIRCUIT
RW-1	14156.86	47173.22	RW 9-27 E
RW-2	14156.26	47189.67	RW 9-27 E

- NOTES:**
- SEE SHEETS E-001 AND E-002 FOR LEGEND, ABBREVIATIONS, INFORMATION ON CIRCUITS, AND GENERAL NOTES.
 - SEE SIGN SCHEDULE ON SHEET E-111 FOR SIGN CONFIGURATION.

SEH FILE NO. DULAL_168904

STATE PROJECT NO. JUN 13, 2023

ISSUE DATE DSB

DESIGNED BY MNB

DRAWN BY

X X

BURNS MEDONNELL

PROJECT 147964 - MAIN OPERATOR 616-333-9400

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR CONTRACT DOCUMENTS WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SHAWN M. WHALEN
DATE: JUN 13, 2023 LICENSE NO. 23984

DULUTH INTERNATIONAL AIRPORT

DULUTH INTERNATIONAL AIRPORT (DLH)

TAXIWAY A

RECONSTRUCTION - PHASE 3

DULUTH, MINNESOTA

APPENDIX

NO. 2

7-6-2023

DATE

DESCRIPTION

REVISIONS

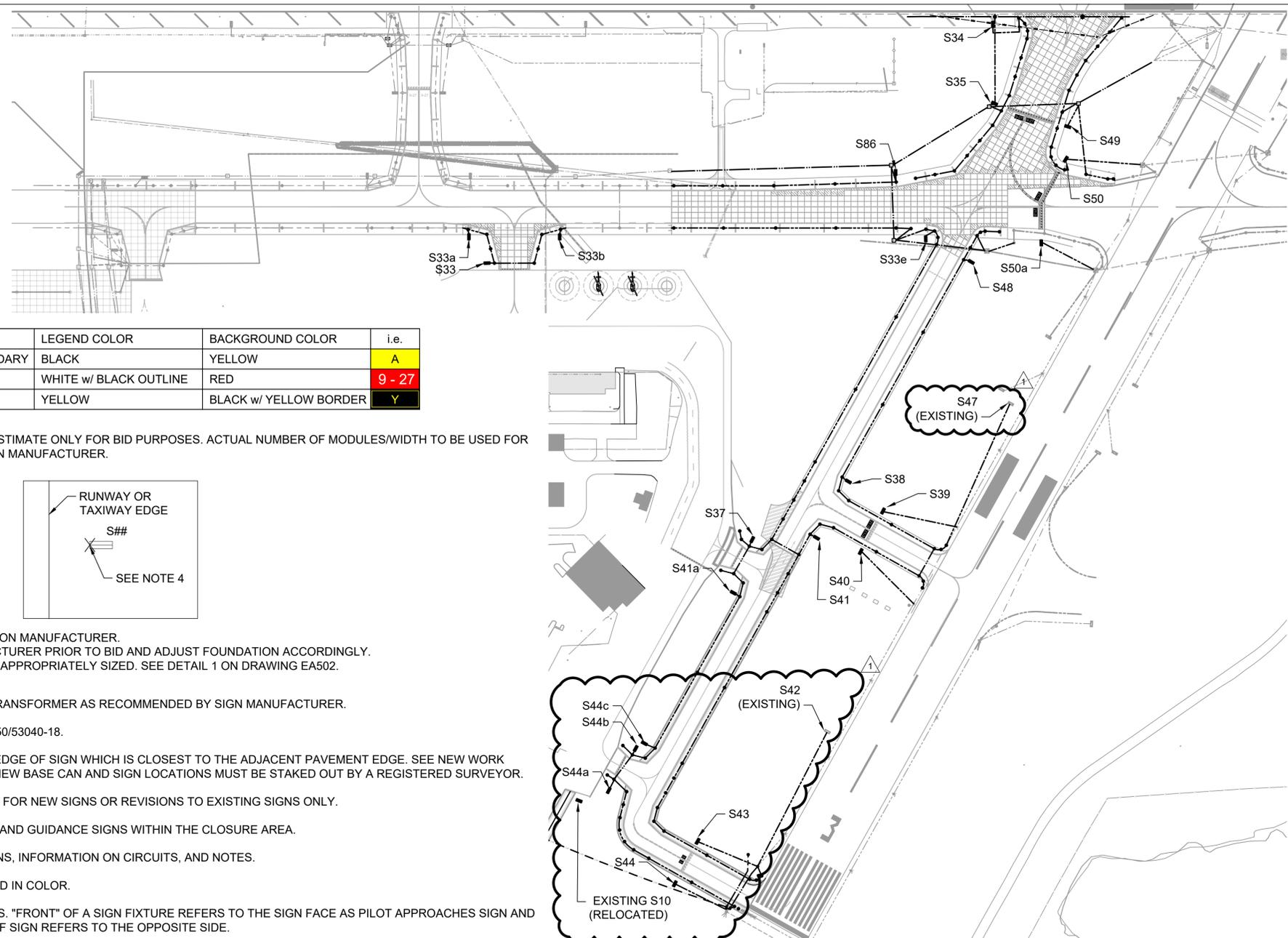
SHEET TITLE

ELECTRICAL SIGNAGE & TAXIWAY LIGHT FIXTURE LOCATIONS

SHEET

E-109

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NOTES:

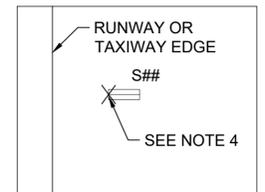
1. SIGN PANEL TYPES:

TYPE	ABBRV.	PURPOSE	LEGEND COLOR	BACKGROUND COLOR	i.e.
L-858Y	Y	DIRECTION, DESTINATION & BOUNDARY	BLACK	YELLOW	A
L-858R	R	MANDATORY	WHITE w/ BLACK OUTLINE	RED	9 - 27
L-858L	L	RUNWAY / TAXIWAY LOCATION	YELLOW	BLACK w/ YELLOW BORDER	Y

1. SIGN LENGTHS AND INSTALLATION PADS:

THE NUMBER OF MODULES INDICATED IS AN ESTIMATE ONLY FOR BID PURPOSES. ACTUAL NUMBER OF MODULES/WIDTH TO BE USED FOR EACH SIGN MUST BE DETERMINED BY THE SIGN MANUFACTURER.

SIGN LENGTHS	
NUMBER OF MODULES	APPROXIMATE LENGTH (FEET)
1	8'
2	12'
3	15'
4	18'



SIGN LENGTH NOTES:

- SIGN LENGTHS MAY VARY BASED ON MANUFACTURER.
- CONFIRM LENGTH WITH MANUFACTURER PRIOR TO BID AND ADJUST FOUNDATION ACCORDINGLY.
- SIGNAGE CONCRETE BASE TO BE APPROPRIATELY SIZED. SEE DETAIL 1 ON DRAWING EA502.

2. TRANSFORMERS:

PROVIDE APPROPRIATELY SIZED ISOLATION TRANSFORMER AS RECOMMENDED BY SIGN MANUFACTURER.

3. RSA/OFZ BOUNDARY PER FIGURE 9(a) OF AC 150/53040-18.

4. SIGN COORDINATES ARE FROM MIDPOINT OF EDGE OF SIGN WHICH IS CLOSEST TO THE ADJACENT PAVEMENT EDGE. SEE NEW WORK SHEETS FOR SIGN LOCATION COORDINATES. NEW BASE CAN AND SIGN LOCATIONS MUST BE STAKED OUT BY A REGISTERED SURVEYOR.

5. THE SIGN LEGEND TABLE ON THIS DRAWING IS FOR NEW SIGNS OR REVISIONS TO EXISTING SIGNS ONLY.

6. COVER OR DISCONNECT ALL TAXIWAY LIGHTS AND GUIDANCE SIGNS WITHIN THE CLOSURE AREA.

7. SEE SHEET EA001 FOR LEGEND, ABBREVIATIONS, INFORMATION ON CIRCUITS, AND NOTES.

8. THIS SIGN LEGEND IS INTENDED TO BE PRINTED IN COLOR.

9. SEE PLAN SHEETS FOR ORIENTATION OF SIGNS. "FRONT" OF A SIGN FIXTURE REFERS TO THE SIGN FACE AS PILOT APPROACHES SIGN AND FACE IS ON PILOT'S LEFT-HAND SIDE. "BACK" OF SIGN REFERS TO THE OPPOSITE SIDE.

AIRFIELD SIGN SCHEDULE - BASE BID

SIGN ID	SIGN LEGEND (NOTE 15)										TYPE (NOTE 1)		SIZE	STYLE	MODULES (NOTE 2)	ISOLATION TRANSFORMER SIZE (NOTE 3)	WORK DESCRIPTION	CIRCUIT INFORMATION	
	FRONT (LEFT TO RIGHT)					BACK (LEFT TO RIGHT)					FRONT	BACK						STEPS	DESCRIPTION
	1	2	3	4	5	1	2	3	4	5									
S43	C4	R6	C3			C4					L/R	Y/L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	TW CS
S41	C	R6				C	C3				L/Y	L/Y	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	TW CS
S39	C3	21-3				C3					L/R	Y/L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	RW 3-21
S40	C3		C			21-3	C3				L/Y	R/L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	RW 3-21
S38	C		C3			C					L/Y	L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	TW CS
S48	C		A			C					L/Y	L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	TW CS
S50	A	21-3					A				L/R	Y/L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	RW 3-21
S50a	A		C			21-3	A				L/Y	R/L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	RW 3-21
S35	C	9-27					C				L/R	Y/L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	RW 9-27
S49	C		A			9-27	C				L/Y	R/L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	RW 9-27
S86	A		C			A					L/Y	L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	TW AE
S33	R5		A			R5	FBO				L/Y	L/Y	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	TW AE
S33a	A	R5				A	A4				L/Y	L/Y	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	TW AE
S33b		R5	A			A					Y/L	L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	TW AE
S33e	A	C				A					L/Y	L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	TW AE
S34	C										Y	BLANK	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	TW CS
S37	R6		C			R6					L/Y	L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	TW CS
S41a		R6	C			C					L/Y	L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	TW CS
S44	C4	R7		C		3	C4				L/Y/Y	R/L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	RW 3-21
S44a	R7										L	BLANK	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	RW 3-21
S44b		C	R7	C4		R7					Y/L/Y	L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	TW CS
S44c	C	R7				C					L/Y	L	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	TW CS
S42	C4										L/Y	BLANK	2	2	3	100W	NEW SIGN ON NEW FOUNDATION	3	TW CS

NOTES:

- SEE SHEETS E-001 AND E-002 FOR LEGEND, ABBREVIATIONS, INFORMATION ON CIRCUITS, AND GENERAL NOTES.
- SEE SIGN SCHEDULE ON SHEET E-111 FOR SIGN CONFIGURATION.
- ALL EXISTING UTILITIES ARE NOT SHOWN ON THE PLANS. CONTRACTOR SHALL VERIFY LOCATIONS AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION.
- COVER OR DISCONNECT ALL TAXIWAY LIGHTS AND GUIDANCE SIGNS WITHIN THE CLOSURE AREA.
- NEW BASE CAN AND SIGN LOCATIONS SHALL BE STAKED OUT BY A REGISTERED SURVEYOR..
- CONTRACTOR SHALL REPLACE, AT NO ADDITIONAL COST, ANY LIGHT FIXTURE, BASE CAN, ISOLATION TRANSFORMER, OR CABLE DAMAGED BY THE CONTRACTOR.
- ALL CONDUITS SHALL BE INSTALLED TO ENSURE THAT WATER MAY DRAIN FROM ANY GIVEN BASE CAN. CONTRACTOR SHALL COORDINATE IN THE FIELD AND DOCUMENT ON AS-BUILT REDLINE DRAWINGS WHICH WAY CONDUITS DRAIN.
- ALL NEW LIGHTING FIXTURE DRAIN CONDUITS SHALL BE INCIDENTAL TO FIXTURE INSTALLATION. STRUCTURE DRAINS INDICATED SHALL BE COORDINATED WITH CIVIL DRAWINGS. WHERE SHOULDERS ARE NOT BEING REPAIRED, CONTRACTOR SHALL SAW CUT EXISTING PAVEMENT AND PATCH, WHICH SHALL BE INCIDENTAL TO DRAIN INSTALLATION.
- CONTRACTOR MUST COORDINATE PHASING OF ALL WORK WITH PHASING PLANS (G0.10 THROUGH G0.16). COORDINATION MUST INCLUDE DAA, ATCT AND FAA REPRESENTATIVES AND MUST TAKE INTO ACCOUNT SYSTEM OUTAGES. ALL CUT-OVERS MUST BE COMPLETED WITHIN A WORK DAY AND LIGHTING CIRCUITS OPERATIONAL PRIOR TO DUSK AS COORDINATED WITH DAA. DUCTBANK CONSTRUCTION MUST BE PERFORMED EARLY IN A GIVEN PHASE WORK AREA SO THAT LIGHTING CIRCUITS CAN BE CUT-OVER PRIOR TO DEMOLITION OF EXISTING DUCTBANKS AND STRUCTURES. PROVIDE TEMPORARY JUMPERING BETWEEN STRUCTURES AS REQUIRED DURING DIFFERENT PROJECT PHASING STAGES.

KEYED NOTES:

- 1 SIGN IS PART OF BID ALTERNATE 1.

PROJECT 147964 - MAIN OPERATOR 616-333-9400

DULUTH INTERNATIONAL AIRPORT

DATE: JUN 13, 2023 LICENSE NO.: 23984

SHAWN M. WHALEN

HEREBY CERTIFY THAT THIS PLAN SPECIFICATION OR CALCULATION WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DULUTH INTERNATIONAL AIRPORT (DLH)

TAXIWAY A

RECONSTRUCTION - PHASE 3

DULUTH, MINNESOTA

MARK	DATE	DESCRIPTION
1	7-6-2023	REVISIONS

SEH FILE NO. DULAL_168804

STATE PROJECT NO. JUN 13, 2023

ISSUE DATE DSB

DESIGNED BY MNB

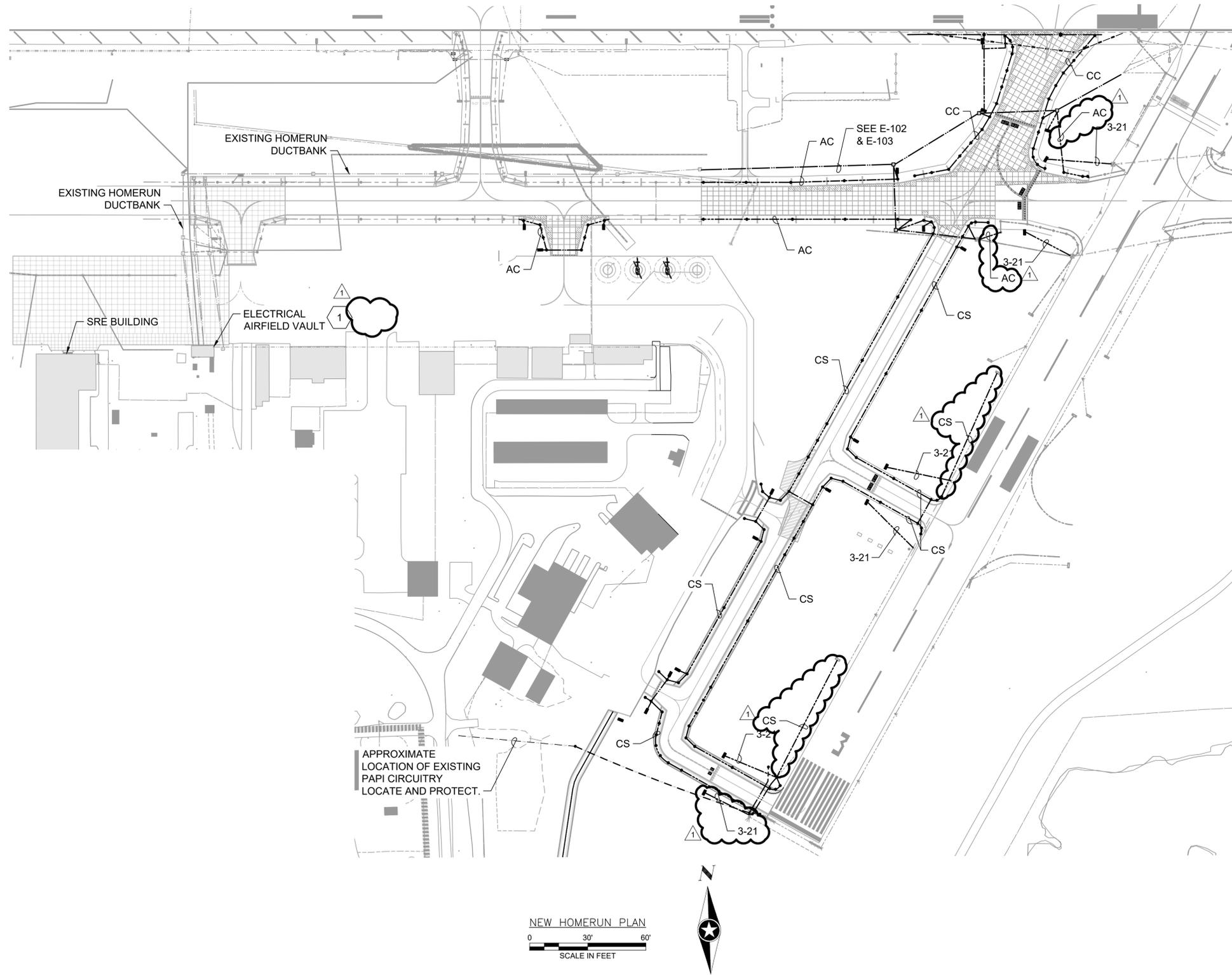
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SHEET TITLE ELECTRICAL SIGNAGE PLAN

SHEET

E-111

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NOTES:

1. SEE SHEETS E-001 AND E-002 FOR LEGEND, ABBREVIATIONS, INFORMATION ON CIRCUITS, AND GENERAL NOTES.
2. SEE SIGN SCHEDULE ON SHEET E-111 FOR SIGN CONFIGURATION.
3. ALL EXISTING UTILITIES ARE NOT SHOWN ON THE PLANS. CONTRACTOR SHALL VERIFY LOCATIONS AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION.
4. COVER OR DISCONNECT ALL TAXIWAY LIGHTS AND GUIDANCE SIGNS WITHIN THE CLOSURE AREA.
5. NEW BASE CAN AND SIGN LOCATIONS SHALL BE STAKED OUT BY A REGISTERED SURVEYOR..
6. CONTRACTOR SHALL REPLACE, AT NO ADDITIONAL COST, ANY LIGHT FIXTURE, BASE CAN, ISOLATION TRANSFORMER, OR CABLE DAMAGED BY THE CONTRACTOR.
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KEYED NOTES:

- 1 SEE SHEET E-401 FOR WORK TO BE COMPLETED IN EXISTING AIRFIELD LIGHTING VAULT.

BURNS MEDONNELL
PROJECT 147964 - MAIN OPERATOR 616-333-9400

DULUTH INTERNATIONAL AIRPORT

I HEREBY CERTIFY THAT THIS PLAN SPECIFICATION, OR SUPPLEMENT, OR ADDENDUM, OR CORRECTIVE ACTION, OR PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SHAWN M. WHALEN
DATE: JUN 13, 2023 LICENSE NO.: 23984

DULUTH INTERNATIONAL AIRPORT (DLH)

TAXIWAY A
RECONSTRUCTION - PHASE 3
DULUTH, MINNESOTA

MARK	DATE	APPENDUM NO.	DESCRIPTION
1	7-6-2023	NO. 2	REVISIONS

SEH FILE NO. DULAI_188904

STATE PROJECT NO. JUN 13, 2023

ISSUE DATE DSB

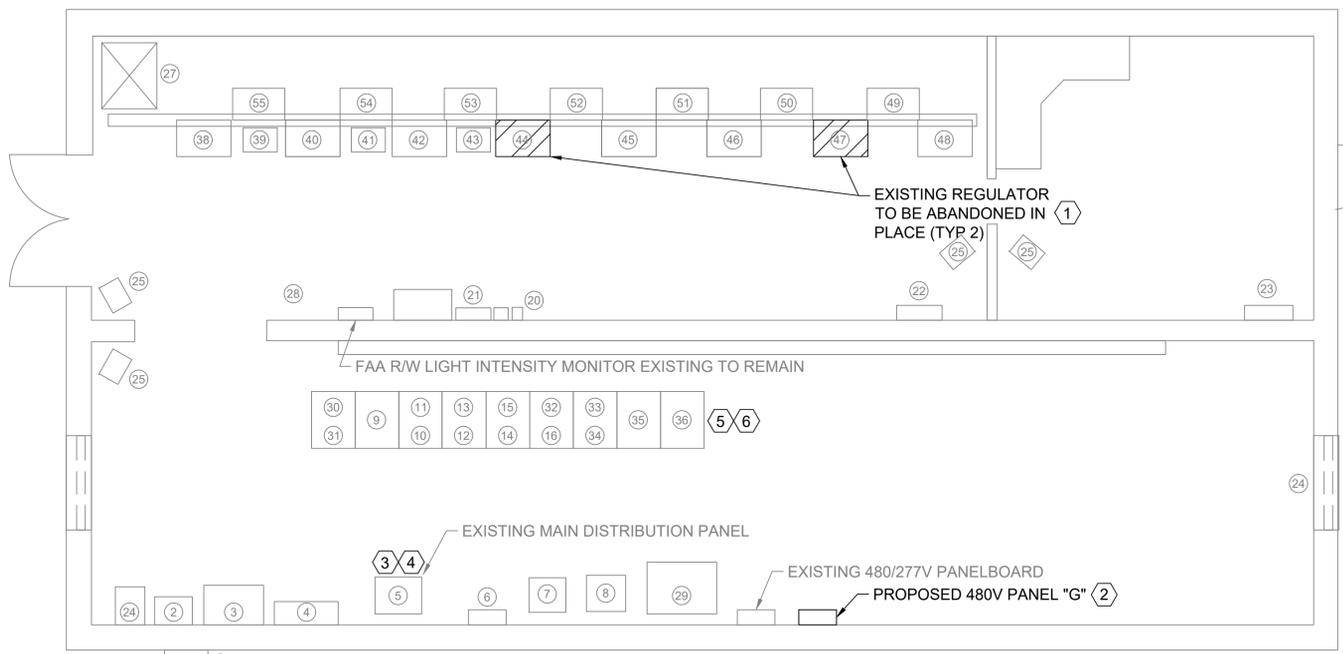
DESIGNED BY MNB

DRAWN BY X

SHEET TITLE
NEW HOMERUN PLAN

SHEET
E-112

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ELECTRICAL VAULT PLAN

PANELBOARD: G												
LOCATION: SUPPLY FROM: MOUNTING: SURFACE ENCLOSURE: NEMA 1				VOLTAGE: 480Y/277V PHASE: 3 WIRES: 4			A.I.C. RATING: 10000 MAINS TYPE: MCB MAINS RATING: 250 A MCB RATING: 125 A					
NOTES:												
#	BKR	P	LOAD SERVED	WIRE / GROUND / CONDUIT	A	B	C	WIRE / GROUND / CONDUIT	LOAD SERVED	P	BKR	#
1	20	2	TW CHARLIE CENTER 4KW CRR	2-#12 AWG, 1-#12GND IN 3/4" C	2000	--			SPACE	1	--	2
3	--	--	--	--			2000	--	SPACE	1	--	4
5	20	2	TW CHARLIE SOUTH 4KW CCR	2-#12 AWG, 1-#12GND IN 3/4" C			2000	--	SPACE	1	--	6
7	--	--	--	--	2000	--			SPACE	1	--	8
9	--	1	SPACE						SPACE	1	--	10
11	--	1	SPACE						SPACE	1	--	12
13	--	1	SPACE						SPACE	1	--	14
15	--	1	SPACE						SPACE	1	--	16
17	--	1	SPACE						SPACE	1	--	18
19	--	1	SPACE						SPACE	1	--	20
21	--	1	SPACE						SPACE	1	--	22
23	--	1	SPACE						SPACE	1	--	24
25	--	1	SPACE						SPACE	1	--	26
27	--	1	SPACE						SPACE	1	--	28
29	--	1	SPACE						SPACE	1	--	30
31	--	1	SPACE						SPACE	1	--	32
33	--	1	SPACE						SPACE	1	--	34
35	--	1	SPACE						SPACE	1	--	36
37	--	1	SPACE						SPACE	1	--	38
39	--	1	SPACE						SPACE	1	--	40
41	--	1	SPACE						SPACE	1	--	42
TOTAL LOAD:					4000 VA	2000 VA	2000 VA					
PANEL TOTALS												
					TOTAL CONNECTED LOAD:	8000 VA						
					TOTAL ESTIMATED DEMAND LOAD:	8000 VA						
					TOTAL CONNECTED CURRENT:	10 A						
					TOTAL ESTIMATED DEMAND...	10 A						
					DEMAND WITH EXPANSION:	12 A						

GENERAL NOTES:

- SEE SHEET E-001 & E-002 FOR LEGEND, ABBREVIATION, INFORMATION ON CIRCUITS, AND NOTES.
- SEE SHEET E-112 FOR SITE ELECTRICAL ROUTE.
- TABLE 1 BELOW HAS BEEN DERIVED FROM "AS BUILT" OR "RECORD" DRAWINGS AND SITE VISITS BY THE RPR. THE EXISTING EQUIPMENT ITEMS AND LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE APPROPRIATE UTILITY/AGENCY, PRIOR TO STARTING WORK, FOR VERIFYING EXISTING EQUIPMENT AND THEIR CONDITION. ANY INTERPRETATION OF AN EXISTING SYSTEM OR UTILITY SERVICE SHALL BE COORDINATED AND APPROVED BY THE AIRPORT AUTHORITY, AGENCY OR UTILITY HAVING JURISDICTION. ANY DAMAGE TO EXISTING EQUIPMENT AND ASSOCIATED ELECTRICAL SHALL BE REPLACED AT CONTRACTORS EXPENSE.

KEYED NOTES:

- ABANDON EXISTING CONSTANT CURRENT REGULATOR (CCR) IN PLACE, SHUT-OFF POWER, AND TURN OVER TO DAA.
- PROVIDE 480V, 3-PHASE / 3-WIRE 250A, 42-POLE MLO PANELBOARD. COORDINATE WITH DAA ON PROPOSED LOCATION FOR PANELBOARD MOUNTING.
- REMOVE EXISTING 3-POLE, 30A SPARE BREAKER AND PROVIDE 3-POLE 125A BREAKER OF SAME STYLE, TYPE AND RATINGS AS EXISTING IN EXISTING MAIN DISTRIBUTION PANEL.
- PROVIDE 3-#1, 1-#8 GND IN 2" EMT CONDUIT FROM NEW BREAKER IN EXISTING MAIN DISTRIBUTION PANEL TO NEW PANEL "G".
- TERMINATE NEW CIRCUIT AE HOMERUN IN EXISTING S-1 CUT-OUT CABINET IN AIRFIELD VAULT BASEMENT. PROVIDE NEW 4KW L-829 CCR IN FIRST FLOOR CCR ROOM FOR CIRCUIT CCNTR. COORDINATE EXACT LOCATION WITH DAA.
- TERMINATE NEW CIRCUIT AE HOMERUN IN EXISTING S-1 CUT-OUT CABINET IN AIRFIELD VAULT BASEMENT. PROVIDE NEW 4KW L-829 CCR IN FIRST FLOOR CCR ROOM FOR CIRCUIT CS. COORDINATE EXACT LOCATION WITH DAA.

TABLE 1

EQUIP #	NAME	VOLTAGE	NOTES	MANUFACTURER/YEAR	STEPS
1	CT CABINET AND UTILITY METER	480V			
2	100KAIC MAIN UTILITY SERVICE CIRCUIT BREAKER DISCONNECT	480V			
3	800A ATS, 3P, 4W	480V			
4	800A MAIN DISTRIBUTION PANEL 'MDP', 3P, 4W	480/277V			
5	150KVA TRANSFORMER	480-208/120V			
6	500A LIGHTING PANEL 'LP'	208/120V			
7	37.5 KVA TRANSFORMER, 1P	480V-2400V	9/27 EAST BARRIER		
8	37.5 KVA TRANSFORMER, 1P	480V-2400V	9/27 WEST BARRIERE		
9	FULL HEIGHT CONTROL CELL FOR REGULATORS			HONEYWELL SGRC	5
10	ABANDONED 10KW REGULATOR				
11	10KW REGULATOR, 6.6A, 3-STEP	480V, 24V CONTROL	TW ALPHA WEST EDGE LTG	HONEYWELL SGRC	3
12	30KW REGULATOR, 6.6A, 5-STEP	480V, 24V CONTROL	RW 3/21 EDGE LTG	HONEYWELL SGRC	5
13	ABANDONED 30KW REGULATOR				
14	20KW REGULATOR, 6.6A, 5-STEP	480V, 24V CONTROL	RW 9/27 WEST CENTERLINE LTG	HONEYWELL SGRC	5
15	20KW REGULATOR, 6.6A, 5-STEP	480V, 24V CONTROL	RW 9/27 TOUCHDOWN LTG	HONEYWELL SGRC	5
16	20KW REGULATOR, 6.6A, 5-STEP	480V, 24V CONTROL	RW 9/27 EAST CENTERLINE LTG	HONEYWELL SGRC	5
17	REMOVED				
18	PLUG CUTOUPS AND CURRENT TRANSFORMER/HOMERUN		RW 9/27		
19	REMOVED				
20	GENERATOR SET REMOTE ALARM ANNUNCIATOR PANEL				
21	REMOVED				
22	PANEL A				
23	PANEL C				
24	EXHAUST FAN DUCT AND INTAKE LOUVERS				
25	UNIT HEATER				
26	NOT USED				
27	FLOOR HATCH TO BASEMENT				
28	REMOVED				
29	45KVA TRANSFORMER, 3P	480-2400V	TACAN		
30	7.5KW REGULATOR	480V	TW A2 LTG	LIBERTY SGRC, 2006	3
31	7.5KW REGULATOR	480V	TW D LTG	LIBERTY SGRC, 2006	3
32	7.5KW REGULATOR	480V	SPARE (WIRED TO 480V)	LIBERTY SGRC, 2006	5
33	10KW REGULATOR	480V	SPARE (NOT WIRED TO 480V)	LIBERTY SGRC, 2006	5
34	10KW REGULATOR	480V	SPARE (NOT WIRED TO 480V)	LIBERTY SGRC, 2006	5
35	REMOVED				
36	30KW REGULATOR	480V	SPARE (CURRENTLY BEING USED FOR TW B)	SIEMENS	5
37	COPPER GROUND BUS ALONG ELEC VAULT WALL				
38	4KW REGULATOR	240V, 120V CONTROL	SPARE	HEAVY DUTY	3
39	7.5KW REGULATOR	240V, 120V CONTROL	SPARE		3
40	ABANDONED				
41	7.5KW REGULATOR	240V	TW A-2 LTG	LIBERTY, 2006	3
42	4KW REGULATOR	240V, 120V CONTROL	ALPHA CENTER LTG	HEAVY DUTY, 1998	3
43	7.5KW REGULATOR	240V	TW D LTG	LIBERTY, 2006	3
44	4KW REGULATOR (TO BE ABANDONED)	240V, 120V CONTROL	TW C CENTER LTG	HEAVY DUTY, 1998	
45	ABANDONED				
46	ABANDONED				
47	4KW REGULATOR (TO BE ABANDONED)	240V, 120V CONTROL	TW C SOUTH LTG	HEAVY DUTY, 1998	
48	4KW REGULATOR	240V, 120V CONTROL	TW 3-21 DTG LTG	HEAVY DUTY, 1998	3
49	4KW REGULATOR	240V, 120V CONTROL	TW A-4 LTG		3
50	7.5KW REGULATOR	240V	TW F	LIBERTY, 2009	3
51	ABANDONED				
52	4KW REGULATOR	240V, 120V CONTROL	TW C-NORTH	CROUSE HINDS	3
53	4KW REGULATOR	240V, 120V CONTROL	TW A-3	HEAVY DUTY, 1998	3
54	4KW REGULATOR	240V, 120V CONTROL	TW A-1	HEAVY DUTY, 1998	3
55	4KW REGULATOR	240V, 120V CONTROL	SPARE		3

ALL REGULATORS ARE 6.6A OUTPUT
CONTROL VOLTAGES ARE LISTED WHERE KNOWN. CONTRACTOR SHALL VERIFY PRIOR TO ALCMS SHOP DRAWING PREPARATION

BURNS & MCDONNELL
PROJECT 147964 - MAIN OPERATOR 8/16-333-9400

DULUTH INTERNATIONAL AIRPORT

HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

SHAWN M. WHALEN
DATE JUN 13, 2023 LICENSE NO. 20904

DULUTH INTERNATIONAL AIRPORT (DLH)
TAXIWAY A
RECONSTRUCTION - PHASE 3
DULUTH, MINNESOTA

ADDENDUM NO. 2
7-6-2023 DATE DESCRIPTION REVISIONS
MARK

DLH\168804
STATE PROJECT NO. JUN 13, 2023
ISSUE DATE DSB
DESIGNED BY MNB
DRAWN BY X

SHEET TITLE
ELECTRICAL VAULT
PLAN

1 SHEET
E-401